An Investigation Into the Validity of Using a CSA to Inform Hypotheses Regarding Student Behavior

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Meredith M. Peterson

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Dedication

This dissertation is dedicated to the students who inspired me to go into this field, and to Jack, who sat by me while I typed every word.

Abstract

Identifying the functions of challenging behavior can lead to interventions that can be effective in decreasing challenging behavior in students, thus leading to improved academic and social outcomes. The purpose of this study was to determine the degree to which a contingency space analysis (CSA) could lead to effective intervention for challenging behavior of middle school students in a general education classroom. Participants were four middle school students, previously identified by their classroom teachers to engage in persistent patterns of challenging behavior. A CSA was conducted with each participant and hypotheses as to the functions of each participants' behavior were developed. Interventions targeting the functions of teacher attention, peer attention, and escape were then implemented and the results were compared to those of the CSA. Results indicated that the CSA accurately predicted the most effective intervention for three of the four participants.

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Chapter 1

INTRODUCTION

Educational Outcomes of Students with Challenging Behavior

Until the Mental Retardation Facilities Construction Act P.L. 88-164 was signed into law in 1963, the education of students with emotional or behavioral disorders (EBD) received little to no attention in educational settings. This law provided funds to assist in the training of educators to work with students with all types of disabilities, including EBD. However, it wasn't until over a decade later in 1975 when P.L. 94-142: The Education for All Handicapped Children Act was enacted, which provided a 'free and appropriate public education' to all children with disabilities. This law was most recently reauthorized in 2004, and is now referred to as the Individuals with Disabilities Education Act (IDEA). Although we have come a long way in the field of EBD, there are many challenges that still face educators regarding how best to serve these students if we want them to be successful after they leave the educational world.

As of 2011, it was estimated that students with EBD accounted for approximately 6% of all special education students (National Center for Education Statistics; NCES). However, it is estimated that 2 to 4 times more students display characteristics that meet the criteria for EBD services (Lane, Wehby, & Barton-Arwood, 2005). Still even more students demonstrate behavior patterns that can lead to conduct problems later in life (Lane et al., 2005). The responsibility of meeting the needs of students with behavior problems is not only placed on special educators, but on general education teachers as well. Outcomes of students with EBD are not promising. Early behavior problems,

particularly when paired with academic deficits, put students at great risk for poor academic outcomes later in life, such as school failure or dropping out (Montague, Enders, Cavendish, & Castro, 2011). The NCES (2009) reported that over 41% of students with EBD dropped out of school before graduation. Also, of those who did graduate, only 41% were employed 8 years out of school and only 44% were living independently.

In a longitudinal study conducted by Montague et al. (2011), nearly one-third of students who displayed both academic and behavioral problems were placed in special education programs by the time they entered 4th grade. Placement in these programs led to a significant decrease in student commitment and engagement in school. They also found that 95% of the students in their study who had qualified for special education services failed high stakes testing and had a disproportionately high dropout rate. The results reported in Montague et al. (2011), along with the reports from the NCES (2009) clearly demonstrate that despite the efforts of special educators, long-term outcomes of students with EBD are not promising, and highlights the need for addressing behavior challenges quickly and effectively.

Regardless of EBD identification, students with emotional and/or behavioral problems display both internalizing and externalizing behaviors. Because disruptive behaviors are not often tolerated in classrooms, students displaying externalizing behaviors are often thought of as 'troubled children.' However, there are many students with emotional and/or behavioral problems whose behaviors are not demonstrated outwardly, but are just as problematic for the student (Bullock & Gable, 2006).

Internalizing behaviors can range from being socially withdrawn, to anxious and non-compliant. Engaging students who display internalizing behaviors in classroom activities can be difficult and can often result in decreased academic outcomes as well as social isolation (Bullock & Gable, 2006; Lane, Kalberg, & Shepcaro, 2009).

Students with emotional and/or behavioral problems arrive at school already at a disadvantage when compared to other students, as they often have social impairments that can lead to challenges establishing and maintaining relationships both inside and outside the school setting (Lane et al., 2009; Walker, Ramsey, & Gresham, 2004). Additionally, their behavioral and academic deficits create challenges for educators to address in an ever-changing classroom environment. Many of these students may appear to be unmotivated, disinterested, or overly anxious, leading to decreased engagement in school (Bullock & Gable, 2006; Dotterer & Lowe, 2011).

School engagement, including both psychological and behavioral, is also a significant predictor of future academic success (Dotterer & Lowe, 2011). Klem & Connell (2004) found that students with higher levels of behavioral engagement in their classes were more likely to have higher grades and attend school more often than those with lower levels of engagement, regardless of socioeconomic status. Thus, finding effective methods for identifying why early behavior problems are occurring and implementing interventions to increase engagement and on-task behaviors of struggling students is important for enhancing both their current learning and future academic success.

Definitions

Functional behavioral assessments. A functional behavioral assessment (FBA) is a valuable framework that has been used in addressing persistent patterns of challenging behavior. An FBA is a process of gathering information to efficiently and effectively determine what variables are influencing problem behavior (O'Neill et al., 1997). It uses descriptive and/or experimental data to identify the function of a behavior, or the motivating and maintaining variable(s) contributing to a particular behavior (Iwata & Worsdell, 2005; McComas, Hoch & Mace, 2000). After the variables influencing problem behavior are identified, effective interventions to target the identified variables can be created, thus improving student outcomes.

Although FBAs were traditionally most often used to address problem behavior of people with developmental disabilities in clinical settings (Lane, Umbreit, & Beebe-Frankenberger, 1999), they have been shown to be effective in addressing challenging behavior in the school setting with typically developing students (e.g., Broussard & Northup, 1995; Dunlap, Kern-Dunlap, Clarke & Robbins, 1991; Lalli, Browder, Mace & Brown, 1993). In fact, in 1997, IDEA added new mandates regarding the use of FBAs in schools. Under this reauthorization an FBA must be conducted if (a) a student is placed in an alternative placement for behavior deemed to be dangerous to self or others; (b) a student is placed in an alternative setting for 45 days due to drug or weapons violations; or (c) a student's suspension or alternative setting placement extends beyond 10 days or constitutes a change in placement (P.L. 105-17; IDEA 1997). Although IDEA (1997) has mandated the use of FBAs under specific circumstances, they can be conducted by school

personnel at any time. An FBA is an effective tool used for addressing challenging behaviors that have not been responsive to general classroom behavior management techniques. It is used to understand and identify the influence of contextual variables surrounding problem behavior so that effective interventions can be implemented prior to or during placement in restrictive settings.

Contingency space analysis. A contingency space analysis (CSA) can be used to analyze data collected during direct observations in the natural environment. It is a method of conducting a functional assessment that does not require experimental manipulation; and is designed to identify the extent to which teacher-delivered consequences are contingent on problem behavior, rather than contiguous with problem behavior (Martens, Gertz, Werder, & Rymanowski, 2010). Whereas contiguous consequences may be closely associated with behavior, but not be related to it, contingent consequences occur more often following behavior than in its absence (Martens, DiGennaro, Reed, Szczech, & Rosenthal, 2008). Observations are conducted in the natural setting and interval recording is used to document behaviors and their consequences. After data are collected, probabilities of behavior/consequence relations are calculated to determine the strength of the contingencies between the behavior and its consequence. For example, the probability of a teacher providing attention for problem behavior can be compared against the probability of the teacher providing attention in the absence of the student's problem behavior. The two conditional probabilities can then be plotted graphically to illustrate the strength of the relationship between the teacher and student behaviors. Although CSA is not able to identify a causal relation as in an

experimental analysis, it can be used to determine the strength of the contingent relation as observed in the natural flow of social interactions.

Rationale for the Study

Addressing challenging behaviors through the use of functional behavioral assessments (FBA) has been increasing in school settings in recent years, although there are limitations to many of the common methods of conducting FBAs in general education classrooms. Identifying methods to address limitations so school personnel are able to efficiently identify effective behavioral interventions is essential for the future success of struggling students.

This study is a replication and extension of a study conducted by Eckert, Martens, and DiGennaro in 2005 to evaluate the utility of a CSA. Eckert et al. (2005) illustrated how a CSA can be incorporated into the functional behavioral assessment (FBA) of a typically developing 7 year-old boy. Conditional probabilities were calculated from systematic observations that were conducted during various academic tasks within the classroom and graphed in the contingency space. An experimental analysis was then used to implement multiple interventions to determine if the most effective intervention matched the results of the CSA. Results indicated that the CSA identified a contingent relation between peer attention and problem behavior for their participant; the results of the experimental analysis and were consistent with the results of the CSA. The current study extended the Eckert et al., 2005 study by including 4 middle school students as participants, and participants were interviewed using the Student Assisted Functional Assessment Interview (Kern, Dunlap, Clarke, and Childs, 1994).

Research Question

This research aims to support previous research supporting the use of a CSA as a potential method of developing hypotheses regarding the function of challenging behavior of individual middle school students. Hypotheses can then be used to inform interventions to be used in the general education classroom. By graphing conditional probabilities within the operant contingency space, the strength of the contingent relation between a behavior and its consequence(s) can be analyzed, and this information can be used to inform hypotheses, and potentially predict effective intervention strategies. This dissertation investigated the following research question:

> To what degree can a contingency space analysis (CSA) be used as a tool in predicting effective intervention for challenging behavior of middle school students in a general education classroom?

Summary

Students who have been identified with EBD, and those who simply have emotional and/or behavioral challenges, are significantly less likely to be successful after they leave the educational setting. They have higher drop out rates, lower employment rates, and more difficulties developing and maintaining social relationships both in and outside of the school setting. Improving engagement and on-task behavior by developing valid hypotheses and identifying effective interventions early is necessary for ameliorating these dire social and academic outcomes, and improving the future success of these students.

Structure of the Paper

This paper provides a review of the currently used methodologies for conducting FBAs, a review of the research associated with those methods, the methods used in conducting this research, results, and conclusions drawn from this investigation. Chapter 2 provides an overview of the methods currently used as well as the strengths and limitations of each. It will also demonstrate the need for additional research in this field of study. Chapter 3 provides information regarding the methods used to conduct this research. Chapter 4 reviews the data collected and provides results of the study. Lastly, Chapter 5 examines the contributions to the existing body of literature that this study provides. Implications on transferring this research to practice will also be outlined, including limitations of this research. Finally, suggestions for future research on identifying effective interventions for students with emotional and/or behavioral challenges will be discussed.

Chapter 2

LITERATURE REVIEW

Matching Intervention to Behavioral Function

Identifying the function of a behavior and creating an intervention to directly target that function has been shown to be more effective in improving behavior than delivering a standard treatment intervention protocol (e.g., Day, Horner, & O'Neill, 1994; Ingram, Palmer, & Sugai, 2005; Iwata, Pace, Cowdery, & Miltenberger, 1994; & Repp, Felce, & Barton, 1988). There are three potential outcomes of a behavioral intervention: (1) the intervention could be effective in reducing problem behavior, (2) the intervention could be ineffective, and (3) the intervention could have a deleterious effect on the behavior. For example, if a behavior is maintained by escape from demands, placing a student in timeout (a standard protocol in many schools) could increase the problem behavior. Therefore, identifying the variables that are influencing a student's behavior and creating interventions to specifically target these variables is an important step in improving behavioral outcomes for struggling students (e.g., Day et al., 1994; Ingram et al., 2005; Iwata et al., 1994; & Repp et al., 1988). Iwata et al. (1994) conducted a study in which multiple extinction techniques were applied across three participants with similar behaviors (self-injurious behavior; SIB) but different functions (i.e. sensory, attention, and escape). They found that each variation of extinction only reduced instances of SIB when it specifically targeted the maintaining function of the behavior for each participant.

The importance of matching intervention to behavioral function can also be seen in a study involving four individuals displaying SIB, conducted by Lerman, Iwata, Smith, Zarcone, & Vollmer (1994). This study indicated that targeting the maintaining function of the behaviors resulted in a decrease of SIB, and also demonstrated that behavioral functions are not necessarily static. They can change over time and the interventions in place to address them may need to be adapted to match the changing behavioral functions. In this study, all participants showed a reoccurrence of target behaviors following initially successful treatment. An assessment was conducted to determine the functions that were maintaining the problem behavior. Results indicated that new or additional functions were maintaining the behaviors of three of the four subjects; therefore, the interventions initially prescribed no longer matched the functions of the behavior. The initial interventions became ineffective in targeting the new or additional functions of the problem behaviors, and modifications to the treatment were necessary to address these newly identified functions.

Ingram et al. (2005) provided further evidence showing the importance of matching intervention to behavioral function in a study conducted in which behavior intervention plans (BIP) were created for two students displaying challenging behavior in the general education classroom. Two BIPs were created for each student, one was function-based using information from an FBA, and the other was non-function based (i.e., standard treatment protocol). The BIPs were compared using an alternating treatments design in order to demonstrate a functional relation with student behavior. Results indicated that the function-based intervention plans produced a significant

decrease in challenging behavior as compared to the non-function-based plans for both participants. These results provide additional evidence that matching intervention to function can result in decreases in challenging behavior, and that the standard treatment protocol may not be sufficient in addressing challenging behavior in a school setting.

Occasionally, problem behaviors can serve multiple purposes, and matching intervention to each maintaining function may yield more successful outcomes. For example, Hoff, Ervin, and Friman (2005) conducted a study with a 12-year-old student with ADHD and found that although the problem behavior decreased when one function of the problem behavior was addressed, the behavior decreased significantly more when both functions were addressed by intervention. Hypotheses of peer attention, escape from a non-preferred activity, and a combination of both functions were generated for the student based on teacher and student interviews and direct observations. Both hypotheses were tested and results indicated multiple functions. The participant's disruptive behavior decreased from 49.9% in baseline to 22.1% when he was moved away from his peers, supporting the peer attention hypothesis. The participant's disruptive behavior decreased again to 7.4% when he was given preferred reading materials, supporting the escape from non-preferred activity hypothesis. When a combination of the interventions was tested, the participant's disruptive behavior decreased to a low of 3.5%, indicating a more successful treatment outcome when both functions were addressed.

Although the previous study supports the notion that all behavioral functions need to be targeted to achieve the most successful outcomes, a number of studies have indicated that this may not always be the case (Ingvarsson, Kahng, & Hausman, 2008;

Rispoli, Ganz, Neely & Goodwyn, 2012). In a study investigating the aggressive behavior of an eight year-old girl with autism, Ingvarsson et al. (2008) conducted a functional analysis that indicated the aggression was maintained by both escape from demands and access to positive reinforcement in the form of edible items. Non-contingent reinforcement with an edible was successful in decreasing the participant's aggressive behavior.

Additionally, Rispoli et al. (2012) conducted functional analyses of the challenging behavior of two children with autism and found that the behaviors served multiple functions, including escape and access to tangible items. They too were able to show that non-contingent reinforcement with an edible was successful in decreasing inappropriate vocalizations in both participants.

The results of Rispoli et al. (2012) and Ingvarsson et al. (2008) should be interpreted with caution. The targeted function in both studies included access to a preferred item, whereas the escape function was not targeted. It is possible that the treatment (i.e., access to preferred items) provided a sufficient period of escape from task demands as to operate as a treatment for the escape function as well, thus essentially targeting both functions of the behavior. Additionally, the functional analysis conducted by Ingvarsson (2008) showed much higher rates of challenging behavior in the tangible condition compared to the escape condition. It is possible that access to tangibles was the only maintaining function of challenging behavior for this participant and that the analysis led to inaccurate conclusions. Finally, the functions of behavior in each study are identical, making generalizations to additional multiple function combinations difficult.

It is unknown whether addressing just one function would yield successful outcomes if the maintaining variables or challenging behaviors were different.

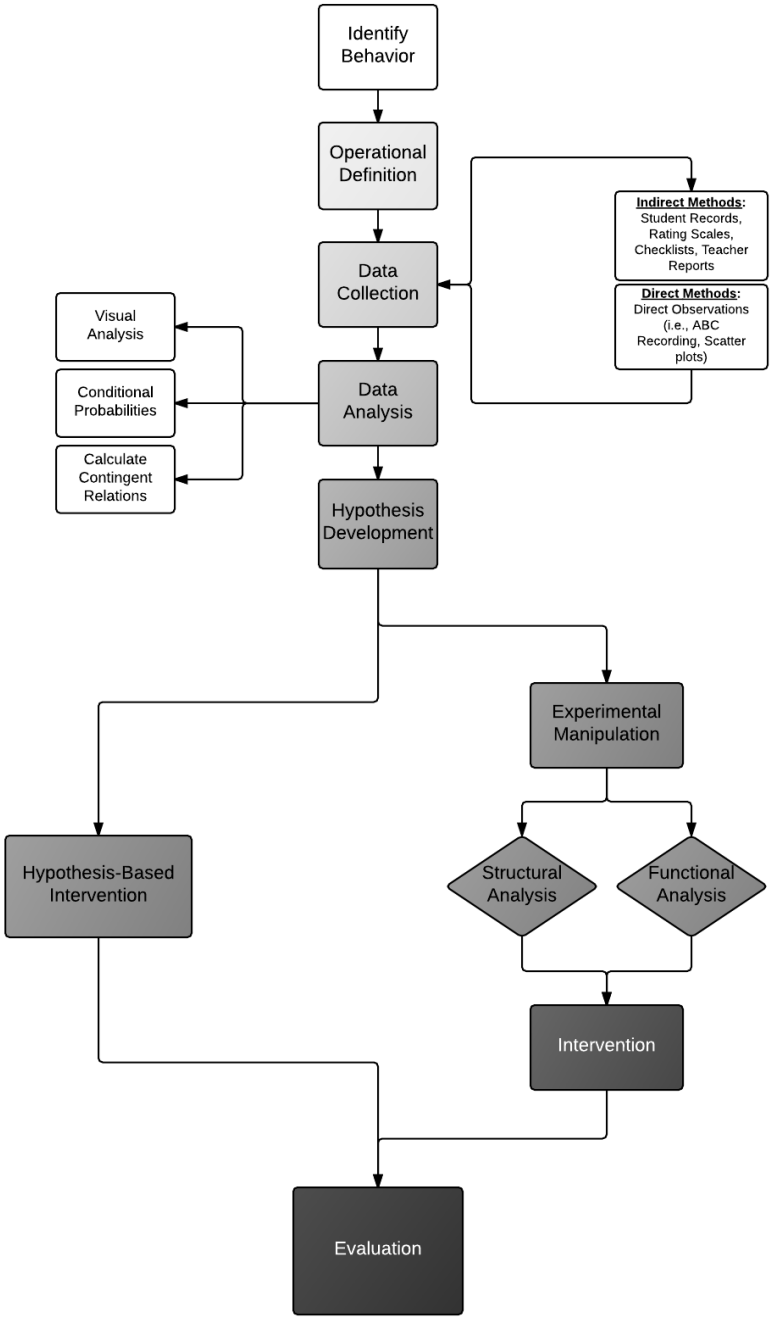
The research supporting the effectiveness of addressing the maintaining variables when implementing behavioral interventions (e.g., Day et al., 1994; Ingram et al., 2005; Iwata et al., 1994; Lerman et al., 1994; & Repp et al., 1988) should lead researchers to focus on matching interventions to identified functions of problem behavior in order to achieve the greatest effect. An FBA can be an effective tool in identifying the functions of such behaviors so that appropriate interventions can be developed.

Steps of an FBA

Within the FBA framework, a variety of tools and approaches have been developed, utilized, and evaluated. Figure 1 outlines the steps of an FBA. Whereas the initial steps are typically consistent, multiple pathways to intervention exist after the initial steps are completed. First, the targeted behavior must be specified and operationally defined. Second, data are collected via indirect and direct methods. Third, a hypothesis regarding the variable influencing problem behavior is developed based on the data that were collected in step 2. After the initial steps are completed, a hypothesis-based intervention may be implemented, or further experimental analysis methods designed to test the hypothesis may be employed before identifying and implementing an intervention. Experimental methods consist of systematically manipulating antecedents or consequences surrounding behavior to determine a functional relation between a behavior and the variables influencing it. The results are then used to design an intervention that

addresses the identified relation between the behavior and specific environmental variables.

Figure 1. Steps of an FBA



Data collection. After operationally defining the target behavior, information is collected through indirect and direct methods. It is not intended that these methods be used in isolation, rather each method provides information to be used in conjunction with additional pieces of information gathered. On the other hand, not all of these methods should be employed for the same case. The assessment needs of the student should be considered on a case-by-case basis and the tools used in the FBA should be chosen based on what is appropriate for that student, and what would aid in generating a hypothesis about the function of the behavior.

Indirect methods. Information about the behavior and the context in which it occurs is often gathered indirectly via student records (e.g., office referrals), teacher reports, interviews, or behavior rating scales or checklists. Behavior rating scales and checklists are tools used for examining strengths and deficits in the areas of social and emotional functioning (Heckaman, Conroy, Fox & Chait, 2000). Interviews with the student and individuals familiar with the student can also provide insightful information about a student's behavior and variables that may be influencing it. Structured interviews use standardized questions to reduce the variance in responses (Pelham, Fabiano, & Massetti, 2005), and are designed to gather information about the topography of problem behavior, when it is most likely to occur, and potential influential factors associated with the behavior. Student interviews can help solicit information from the student regarding behavior, perceptions of behavior, and attitude towards various aspects of school, and can be effective in obtaining information that can lead to successful behavioral interventions (Kern et al., 1994). However, indirect methods can be unreliable when used in isolation.

Indirect methods often rely on a person's historical recollection of events, which can lead to biased reports. Therefore, it is important to consider using multiple methods of assessment so an accurate and comprehensive picture of the problem behavior can be considered.

Direct methods. Direct methods of gathering information include direct observations of a student's behaviors and the variables surrounding them. Methods of collecting data during direct observations can vary. Antecedent-behavior-consequence (ABC) recording (Bijou, Peterson, & Ault, 1968, McComas et al., 2000), and scatter plots (Touchette, Macdonald, & Langer, 1985), are both methods of collecting direct observation behavior data in a natural environment, and each has been shown to be effective in informing hypotheses.

ABC recording is a form of descriptive analysis in which direct observations are made of an individual's problem behavior. Information about the antecedents and consequences surrounding the behavior are reported in a narrative form and analyzed to determine if there is consistency with specific variables that could indicate potential contiguous relations (Lerman & Iwata, 1993). For example, if disruptive behavior is typically followed by teacher attention, it may be indicative that teacher attention is the function of the disruptive behavior. Although ABC recording is a common technique used during direct observations, it is time intensive and conclusions cannot be drawn regarding functional relations between a behavior and the events surrounding its occurrence.

Scatterplots can be used as a way of identifying patterns, as well as the rate or intensity of the behavior within a natural setting. Each time a behavior occurs, the instance can be plotted in a grid during a specific time interval. If a pattern exists, it will be visible after several days of data collection. Variables such as time of day, people present, activities occurring, or a combination of variables may contribute to the pattern of behavior and can be addressed after the pattern is discerned. Scatterplots can be useful when attempting to identify a particular time a behavior is likely to occur; however, they are limited in that they do not provide information regarding specific antecedents or consequences surrounding behavior. Additionally, several days of data are required before a distinguishable pattern emerges.

Like scatterplots, interval recording provides quantifiable data from systematic observations of the occurrence of student behavior in the natural setting. These data can be analyzed to identify characteristics such as rate, frequency, and duration of problem behavior as well as the variables that may be influencing it. This information can then be used in hypothesis development.

Hypothesis development. Following indirect and direct data collection, the next step of the FBA requires an analysis of available data for apparent patterns in antecedent-behavior-consequence relations. This information is used to formulate a hypothesis regarding the relation between environmental variables and the problem behavior. Behavior is either positively reinforced through attention from peers or adults, access to preferred items or activities, or sensory reinforcement, or negatively reinforced by escape from undesired activities or environments (McComas et al., 2000). Do the data show that

the behavior is most often preceded by a certain event or environmental change? Do the data suggest that the behavior appears to result in a consistent consequence? These types of questions assist in identifying patterns and developing a hypothesis as to whether the behavior is positively or negatively reinforced. After a hypothesis is developed, interventions designed to address the relation between the behavior and the influencing variable can be created, or specific hypotheses about behavior-environment relations can be experimentally tested.

For example, direct and indirect data indicate that teacher attention might be influencing student behavior because the behavior results in teacher attention following problem behavior more often than following appropriate behavior. An intervention designed to re-allocate teacher attention might then be implemented so that teacher attention follows appropriate behavior more often than inappropriate behavior.

Experimental Analysis vs Hypothesis-Based Intervention

Although an experimental analysis can demonstrate a functional relation between a behavior and the variables influencing it, the time and resources required to conduct the analysis can be prohibitive in some situations and may not always be necessary. Therefore, it may be more appropriate to implement a hypothesis-based intervention following the development of a hypothesis rather than spend additional resources conducting further experimental analyses.

Experimental analysis. Experimental analyses can be divided into two categories: consequent- or antecedent- based. The consequences or antecedents, or a combination of the two, surrounding problem behavior can be systematically manipulated

to identify the functional relations between these variables and the target behavior. By determining functional relations, the most efficient and effective method of addressing the behavior can be more easily identified. Experimental analysis is considered the gold standard of functional assessment due to the fact that the intensive and experimental nature of the method can conclusively lead to identification of functional relations between a behavior and the consequence that is reinforcing it.

Consequent-based analysis. Consequent-based or functional analysis involves experimentally manipulating consequent variables that maintain problem behavior (Stage Jackson, Moscovitz, Erickson, Thurman, Jessee, et al., 2006; Stichter, Sasso, & Jolivette, 2004). The consequences can be modified or eliminated by either extinction, or alternative reinforcement so they no longer maintain problem behavior. Iwata, Dorsey, Slifer, Bauman, and Richman (1982/1994) pioneered functional analysis technology and described it in their seminal article in which they conducted a study that involved repeated observations of participant behavior during pre-determined analog conditions. An analog condition is one that closely resembles the natural environment but may not be identical to it. Analog conditions allow for consequent variables to be systematically manipulated while other variables are held constant, to help determine functional relations. In a functional analysis such as this, conditions are experimentally manipulated to observe the participants' behavior during differing reinforcing conditions. During these conditions, dependent relations between a behavior and a consequence can be arranged. Dependent relations occur when a reinforcer follows a behavior each time the behavior occurs, but never occurs in its absence (Vollmer, Borrero, Wright, Van Camp, & Lalli

2001). Increased rates of behavior in one condition identify the environmental variable influencing the target behavior (Iwata et al., 1982/1994). For example, a participant will be given attention contingent on problem behavior to determine whether attention is a possible function of problem behavior. If the problem behavior increases during the attention conditions, relative to other conditions being evaluated, attention is likely a reinforcer and should be addressed by intervention. The same can be done with hypothesized functions such as escape of task demands, sensory reinforcement and access to tangible reinforcements.

A great deal of research on functional assessment has included functional analysis in analog settings (Chitiyo, 2005). Functional analysis has been shown to be effective in addressing challenging behaviors with a variety of individuals in applied and analog settings (Broussard & Northup, 1997; Lerman & Iwata, 1993; Wright-Gallo, Higbee, Reagon, & Davey, 2006) although research on the use of functional analysis with middle school students is limited (Lane et al., 2009).

Antecedent-based analysis. As an alternative to manipulating consequences, in antecedent-based experimental analysis, or structural analysis (Carr & Durand, 1985; Stage et al., 2006; Stichter et al., 2004), the antecedent events can be modified or eliminated so that they no longer evoke problem behavior (Hagen-Burke, Burke, & Sugai, 2007). For example, if a student's off-task behavior occurs more often when completing certain academic tasks, an analysis of task completion can be conducted to determine if there are patterns present. If it is determined that the student is commonly off-task during less challenging tasks, this can be addressed with an intervention, thereby

proactively preventing off-task behavior. Although antecedent-based strategies are significantly less common than consequent-based strategies (Chitiyo, 2005), they can proactively lead to decreased problem behaviors and potentially be used to teach more appropriate behaviors simultaneously (Chitiyo, 2005; Stichter et al., 2004). Antecedent-based strategies have the potential to be useful for students of all ages and disabilities and with a variety of target behaviors (Chitiyo, 2005; Dunlap et al., 1991; Ervin, DuPaul, Kern, & Friman, 1998; Stichter et al., 2004). They have the added benefit of providing a proactive strategy to help prevent challenging behaviors (Stichter et al., 2004).

Advantages and limitations of experimental analysis. Although positive treatment outcomes support the validity of a hypothesis, they cannot do so as definitively as an experimental analysis in which a specific hypothesized operant function of the behavior is isolated and manipulated in an analog condition to identify a functional or dependent relation (Carr, 1994). Experimental analysis is considered the gold standard in functional assessment methods as functional relations can be seen between behavior and the surrounding variables. It is possible to manipulate these variables and see direct changes in behavior as a result, potentially leading to more definitive hypotheses and targeted interventions.

Despite the potential for experimental analysis to substantiate hypotheses, this method of FBA comes with a host of limitations. A chief limitation is the significant complexity of the analysis. Given this complexity, identification of a more efficient method of conducting an FBA and identifying effective treatment is needed in school settings (Scott, Anderson, & Spaulding, 2008).

Second, experimental analysis may fail to take into account variables that occur within a person's natural environment; therefore, the results may not generalize outside of the experimental conditions. For example, a functional analysis might be conducted in an analog setting with a student displaying off-task behavior. If the variable influencing the behavior is another student in the classroom, the results of the analysis might be inconclusive if that variable is not present in analog conditions.

A third limitation of experimental analysis is the time, skills, and expertise required to conduct them accurately. For example, it may not be feasible for a classroom teacher to take time away from her class in order to conduct experimental manipulations with a child who is exhibiting behaviors that disrupt the rest of the class. Furthermore, general education teachers do not typically possess the knowledge and skills required to conduct experimental analyses (Scott et al., 2008). If additional resources are not available (e.g., trained staff members), less comprehensive methods would need to be utilized such as hypothesis-based intervention. Even with trained staff members to conduct a functional analysis, a student's behavior may not manifest in the same way with a novel adult as it would with the regular teacher.

A fourth limitation of experimental analysis occurs if the targeted behavior is potentially harmful to the student or others. In this situation, an analog experimental analysis may not be appropriate. The purpose of experimental analysis is to manipulate environmental conditions so the varying rates of the behavior can be observed and analyzed; however, if manipulations of the environment could lead to further injury, this method may not be appropriate, particularly in school settings. Alternatively, behaviors

that occur at low rates may not be exhibited during an experimental analysis, thus requiring additional methods of analysis to determine how best to address the behavior. No literature could be found on the use of experimental analysis with typically developing middle or high school students. Concerns with student reactivity to rapidly alternating contingencies in analog sessions might severely limit its use with this population.

Hypothesis-based intervention. An intervention designed to target the variables hypothesized to be influencing the behavior is a hypothesis-based intervention. Unlike experimental analysis, in which manipulation of potentially influential variables is conducted, and the results are used to create an intervention, hypothesis-based interventions are created based on the hypothesized influential variables, and effects on problem behavior are evaluated. By systematically assessing the effects of hypothesis-based interventions on problem behavior, researchers have been successful in decreasing problem behaviors of students in a variety of settings and populations (Eckert et al., 2005; Packenham, Shute, & Reid, 2004; Repp et al., 1988; Repp & Karsh, 1994).

For example, Repp and colleagues (1988) implemented interventions addressing two hypothesized functions of stereotypy and self-injurious behavior (SIB) across three subjects. Both hypotheses were tested in separate classrooms and the treatment shown to be the most successful was then implemented in both classrooms for each student, resulting in consistent findings over multiple settings. Packenham et al. (2004) implemented interventions with two typically developing elementary students. The interventions were based on hypotheses created following teacher interviews and

consultations with the teachers. It was hypothesized that one student's behavior was maintained by attention and the other student's behavior was maintained by escape from academic demands. The classroom teacher implemented interventions designed to target the hypothesized maintaining variable for each student, and results indicated a decrease of disruptive behavior for both students.

Advantages and limitations of hypothesis-based intervention. Hypothesis-based interventions are beneficial for several reasons. First, they can be conducted in a natural setting more readily than experimental analyses (Scott et al., 2008). Second, they require fewer resources than experimental analyses and can therefore be implemented more easily by classroom teachers (Packenham et al., 2004). Third, they require no experimental manipulations, which allows for them to be implemented much more quickly than interventions following experimental analysis. Faster implementation of interventions has the potential to lead to effective intervention more quickly. Hypothesis-based interventions may be appropriate in circumstances where waiting for additional information may be a detriment to the child or classroom, such as students who are at risk for losing an educational placement or being moved to a more restrictive setting. Although this method can be completed quickly, it cannot determine functional relations because no experimental manipulations are conducted. Because functional relations cannot be determined, the intervention may be ineffective and additional methods of analysis might be required to identify functional relations and effective interventions. Additional analyses can lead to increased time and resource expenditures and delayed implementation of effective intervention for the individual. Additionally, in the case of

competing hypotheses, there is a risk of a deleterious effect on problem behavior if the wrong intervention is implemented.

Choosing Methods

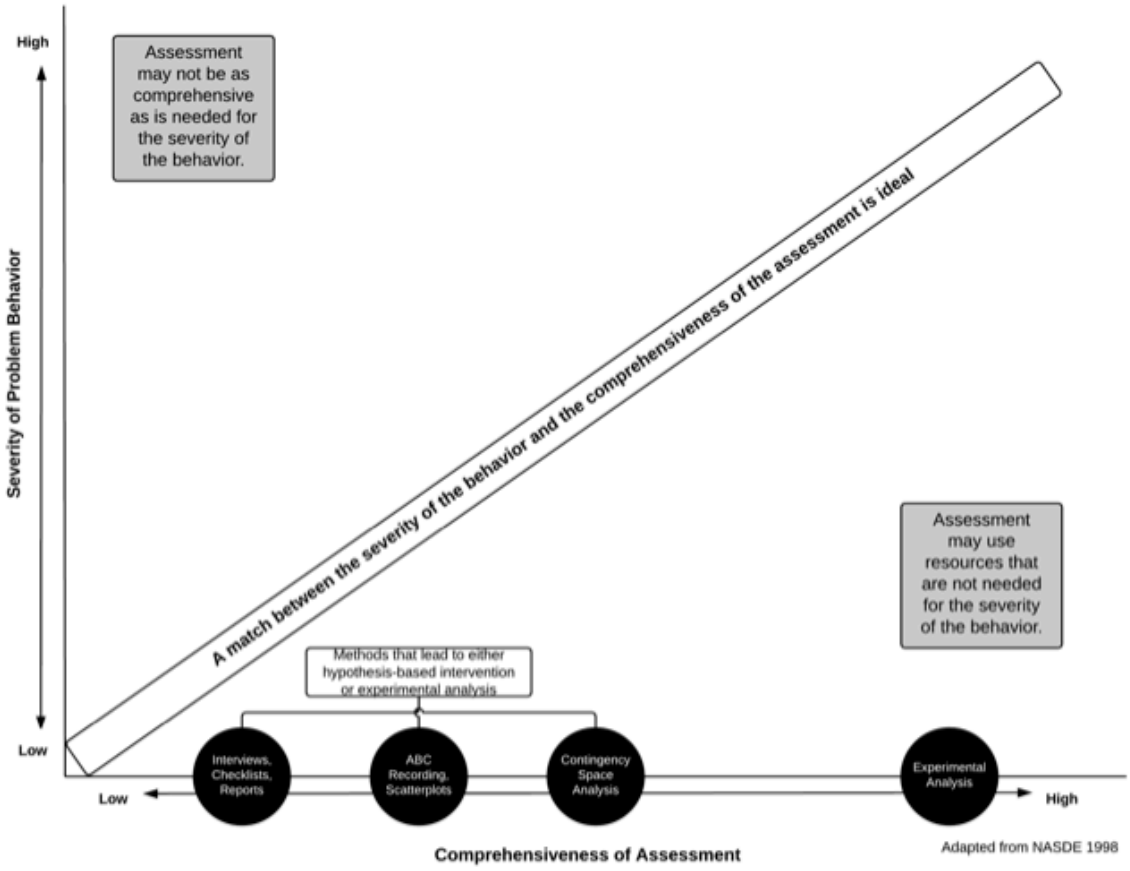
There are multiple methods available for conducting an FBA, requiring various levels of resources. Whereas challenging behavior can range in intensity, FBAs can range in rigor, and a match between the intensity of the problem behavior and the comprehensiveness of the FBA is ideal (see figure 2). Methods that are the most time and resource intensive (i.e., structural and functional analysis) are able to demonstrate functional relations between behavior and the variable influencing it; however, methods that are less resource intensive (e.g., direct observation, interviews) do not demonstrate functional relations, but may be able to provide enough information to assist in the development an effective intervention. For example, a behavior that is high in intensity and may lead to a change in placement or threatens the safety of a student could require an FBA that is much more comprehensive and is able to demonstrate a functional relation than an FBA that addresses the behavior of a child displaying occasional off-task behavior. It would be appropriate to use the additional time and resources necessary to identify effective interventions to address behaviors of high intensity, but it would not be an appropriate use of resources to use the same methods with a behavior that is low intensity. A less intrusive and resource intensive method of determining what is influencing the behavior may be more applicable in this circumstance. Figure 2 illustrates the relation between the intensity of the problem behavior and the comprehensiveness of the FBA method required.

There are also circumstances where a consequent-based analysis is more appropriate than an antecedent based analysis and vice versa. A consequent-based analysis would be more appropriate to conduct if challenging behavior is occurring at a high rate. If the behavior is happening frequently and reinforcement is constant when the behavior occurs, it would be beneficial to conduct a consequent based analysis because you can very quickly change the reinforcement and see the effects of the change. Also, if the reinforcer is constant, then you can begin to examine establishing operations and discriminative stimuli. Conversely, it would be much more difficult to conduct a consequent-based analysis if the rate of behavior was low. The effects of altering the reinforcer in this situation would not be as apparent and it may be less likely that the reinforcement schedule of a low rate behavior would be as consistent as it would be with a high rate behavior (i.e. it would be more difficult for the student to identify and react to changes in reinforcement contingencies and the behavior may be more resistant to extinction).

Circumstances where an antecedent-based analysis is more appropriate include situations where students display low rate behaviors or behaviors such as non-compliance that are essentially the absence of behavior or non-behavior. In situations such as these, identifying a reinforcing consequence can be difficult. For example, if a student is non-compliant, he or she may be receiving reinforcement in the form of escaping the task, or it may be the attention they eventually receive. The reinforcement may not be immediate, so identifying the reinforcer may be challenging. By altering the antecedents that are hypothesized to be influencing the behavior, it is plausible that changes can be seen more

readily. For example, if a student refuses to participate during a specific activity, that activity can be changed and the effects on the behavior can be seen.

Figure 2. Relationship between comprehensiveness of an assessment and severity of problem behavior



Effective and Feasible in Schools

FBAs can lead to the development of successful individualized behavior intervention plans for students with challenging behavior (O'Neill, Horner, Albin, Sprague, Storey, & Newton, 1997. Horner (1994) states "the major difficulty comes from trying to identify a procedure that both delivers very precise, usable, valid information

about the problem behavior, yet does so with minimal time, effort, and expectations about the skills of the implementers" (p. 402).

Identifying the most efficient and effective method of conducting an FBA in a school setting comes with a host of challenges. With regard to conducting an FBA in a school setting, efficiency refers to how easily school personnel can conduct an FBA in addition to their regular duties (Scott, Bucalos, Liaupsin, Nelson, Jolivette, & DeShea, 2004). In addition to being feasible for school personnel to implement, the instruments and procedures used in the FBA should be empirically validated (Scott et al., 2004).

Although research on the use of functional assessment with typically developing students and students with EBD has been increasing (Quinn, Gable, Fox, Rutherford, Van Acker, & Conroy, 2001), literature on the use of FBAs with secondary age students is limited and not yet evidence-based (Lane et al., 2009). Barriers that impede the use of FBA methods in a general education setting include (1) large class sizes, (2) time constraints, and (3) a lack of knowledgeable staff to implement the FBA. Class sizes in general education classrooms are generally considerably larger than those in exclusionary settings making it difficult for classroom teachers to take the necessary time to complete an FBA (Scott et al., 2004). Additionally, the special education teacher or the school psychologist traditionally have been relied upon to conduct such assessments (Vollmer & Northup, 1996), leaving general educators with little knowledge of how to effectively complete an FBA (Scott et al., 2004, Scott et al., 2008).

Although there are challenges associated with conducting FBAs in a school setting, research has shown some methods to be effective in identifying variables

influencing problem behavior in students (e.g., Dunlap et al., 1991; LeGray, Dufrene, Sterling-Turner, Olmi, & Bellone, 2010; Packenham et al., 2004). The predominant methods of choice for conducting an FBA included teacher and student interviews as well as direct observational techniques, such as ABC recording (Scott et al., 2004). In addition to these methods, a small number of studies have indicated that experimental methodologies, such as structural and functional analyses, can also be effective in addressing challenging behaviors in a school setting (e.g., Ervin et al., 1998; Hagen-Burke et al., 2007; LeGray et al., 2010). However, in each of these studies, the assessment was conducted by a researcher rather than the teacher, making it difficult to determine whether the procedures would be feasible for school personnel to implement.

Regardless of the challenges outlined, it is essential to identify effective methods of addressing challenging behavior in school settings. Multiple factors need to be taken into consideration when choosing a method for analyzing student behavior. These factors include (1) whether the behavior can be observed, (2) the rate at which behavior occurs, (3) whether interventions have been attempted, (4) the severity of the behavior, and (5) the resources available to conduct the assessment. If the behavior is unobservable, direct observation techniques will be ineffective (e.g., stealing, cheating, lying). In a situation such as this, other sources of information such as interviews, checklists or questionnaires may provide more information. Behavior that occurs at a low rate (i.e., only happens intermittently) may be difficult to observe and would require vast amounts of time and resources to ensure that the behavior relations are observable during direct observations. Additionally, if a student is aware that he or she is being observed, the student may react

to the observer and the rate of behavior may be affected. For example, the behavior may not occur in the presence of an unknown person in the classroom; or the rate of behavior could increase, making it difficult to determine what the rate of behavior typically looks like. This is another situation where other sources of data may provide more information. If a student has had a history of challenging behavior and multiple interventions have been attempted, it may be more appropriate to use an experimental approach to understand the variables influencing the behavior so an effective intervention plan can be developed. Finally, if the intensity of the behavior is such that conducting a functional analysis, where rates of challenging behavior would be temporarily increased, is not feasible or safe in a school environment, implementing a hypothesis-based intervention might be a more appropriate option.

There are advantages and disadvantages to the following methods used to conduct an FBA: (a) indirect and direct methods of data collection, (b) hypothesis-based intervention, (c) experimental analysis (i.e., functional and structural). The advantages and disadvantages must be weighed against the intensity of the problem behavior as well as the resources available for conducting the FBA. Finding a balance between what is feasible and what is effective in a school setting is an area that requires further research if we hope to successfully address challenging behavior in the school setting.

Contingency Space Analysis

A recently emerging approach to analyzing behavior that has the potential to address some of the limitations of the methods previously reviewed is contingency space analysis (CSA; Martens et al., 2008). A CSA can be conducted in the natural

environment through direct observation, and is designed to identify the extent to which teacher-delivered consequences are contingent on problem behavior (Martens et al., 2010). It may be a useful tool in strengthening hypotheses so that hypothesis-based interventions may be more effective. Contingency strength refers to a continuum of behavior/consequence relations. A strong positive contingency occurs when most of all instances of behavior are reinforced and reinforcement is rarely delivered in the absence of the behavior. A neutral or zero contingency occurs when reinforcement occurs at near equal rates following instances of behavior and instances of no behavior.

Conducting a CSA addresses several of the limitations associated with experimental analysis. First, observations are conducted within the natural environment thus increasing the generalizability of the results. Second, CSA is less time and resource intensive than experimental analysis and the training required to complete a CSA is minimal. Novel staff would not need to be introduced into the room, decreasing the chances for reactivity from the student. Third, although experimental analyses require systematic manipulation of variables to identify increased rates of behavior in specific conditions, this is not the case for CSA. It is a tool that can potentially bridge the gap between descriptive assessment and experimental analysis, and warrants further investigation. The strength of the relations between behaviors and the consequences that follow can be analyzed rather than systematically creating circumstances where dependent relations occur in experimental analyses.

Numerous studies have incorporated the use of descriptive methods while conducting FBAs in a school setting; however, fewer have focused on the use of

conditional probabilities for informing hypotheses. Calculating conditional probabilities of student behavior and the subsequent consequences and graphing them in the contingency space can help illustrate the strength of their relation. This information can then be used in the development of a hypothesis as to the variable(s) influencing the behavior. In a study conducted by Martens et al. (2010), three preschool age children with autism were observed in their school classroom. The probability of teacher-delivered consequences following problem behavior was calculated and graphed within the contingency space. The teacher and an experimenter conducted functional analyses to determine whether the results were consistent with the results of the CSAs. Results indicated that the CSAs were consistent with the results of the functional analyses for two of the three participants, particularly when attention was contingent on problem behavior on a moderate to rich schedule. The utility of a CSA to determine other functions of behavior, such as escape, has yet to be determined, but results are promising. Additionally, Eckert et al., (2005) conducted a study with a typically developing 7 year-old student. Three hypothesis-based interventions were implemented and the effects were compared against the results from a CSA. The results indicated that the CSA supported the results of the hypothesis-based interventions; thus adding further support to the use of CSAs as a tool to help inform strong hypotheses. A CSA could potentially be used in the development of a hypothesis so a functional analysis may not be necessary, and could be replaced with a more efficient method under particular circumstances.

Although a small number of studies have researched the validity of the CSA for identifying effective interventions, the limited research on the use of the CSA has called

into question the utility and validity of the method itself (Martens et al., 2008). This method is in its infancy and at issue is the validity of the CSA as a valuable tool for specifying the reinforcers for problem behavior. Although the validity of CSA method has been demonstrated in limited populations and settings (e.g., Eckert et al., 2005, Martens et al., 2010), the validity of using a CSA to inform hypotheses has not yet been addressed with older, typically developing students, and the current studies have not yet been replicated. If it is determined that a CSA is a valid method of informing hypotheses with varying populations or behaviors, FBAs may become more efficient to conduct. By using fewer resources, we may be able to develop interventions that are just as effective as those created following the more experimental methods of conducting an FBA (i.e. structural and functional analysis).

The training required to complete a CSA is minimal when compared to the training required to conduct an experimental analysis. The CSA procedure takes relatively fewer observations sessions than an experimental analysis, and no analog sessions requiring isolation and manipulation of influential variables are necessary. The time and expertise necessary to successfully complete a functional analysis are resources that the general education classroom teacher generally does not possess. CSA technology can act as a bridge between the commonly used indirect methods of data collection, and the gold standard of the experimental analysis in school settings.

Conclusion

Addressing problem behavior in a school setting is a challenge that many educators face; yet it is an important challenge, as problem behaviors can lead to

academic deficits and potentially poor outcomes later in life. Addressing these challenges is imperative if we want the best chance at helping students with emotional and/or behavioral problems succeed. FBAs have been shown to be effective tools in the development of successful behavior interventions for people with disabilities, as well as typically developing students in early years; however research is sorely lacking in finding the best methods of conducting FBAs with typically developing middle school students. By the time students have reached this age, they have often displayed behavior problems for an extended period of time and it is likely that numerous interventions have been tried, but the continuation of problem behaviors indicates that previous interventions have not yet been successful. By identifying the variables influencing the behaviors, more appropriate interventions can be developed to better help these students.

The *Journal of Applied Behavior Analysis* (2013) recently published a special issue on functional analysis. The entire issue was dedicated to highlighting the extension of functional analysis technology to include behaviors of social importance as well as problem behaviors of typically developing preschool students. Nowhere in the issue are typically developing middle school students with behavior challenges mentioned. This failure to address a population in such need of attention is disheartening and unacceptable and identification of more effective and efficient methods of addressing problem behavior needs to be a priority.

Chapter 3

Method

Participants and Setting

Participants recruited for this study included eight male middle school students in a midwestern suburban school. Participants attended classes in the general education setting, and exhibited persistent problem behavior in the school setting. Each participant had a history of problem behavior that had been documented by office referrals and parental contact regarding behavior. School personnel referred students for participation based on referrals and behavior reports from classroom teachers. The school counselor provided all identified students with a consent form for their guardian(s) to sign (see Appendix A). When the consent form was returned, participants were rewarded with a small tangible, regardless of whether they had agreed to participate in the study. Of the eight recruited students, four returned their parental permission forms and were provided with an assent form to sign (see Appendix B) to indicate agreement to participate in the study. All four of these students agreed to participate in the study.

Participants included four 7th grade males; two Hispanic students (Raul and Antony), one Somali student (Sahal) and one mixed-race student (DeShawn). None of the students received special education services, but all were performing below grade level standards in math class. The classroom teacher was a Caucasian woman with Masters degree in Education. She had been working in the district for 12 years, teaching middle school math classes, and volunteered to participate in this study due to high rates of problem behavior in her classroom. All interventions took place in the general education

math classroom during regularly scheduled classroom activities and were implemented by the same classroom teacher. All intervention sessions were observed and coded by a graduate researcher (see Appendix C). Interventions were conducted in the math class due to high rates of problem behavior reported by the math teacher for all participants. Two participants were in one math class and the other two students were in the following class. The material taught during the classes was identical, as was the format of the class. Each class consisted of teacher lecture, small group work, and independent work time interspersed throughout the class. Both classes were comprised of approximately 25 students.

Behavior Definitions

Dependent Variable. The dependent variable was the percentage of time during which the student engaged in problem behavior during each of the intervention phases. Student behaviors coded included appropriate behavior and inappropriate behavior. Inappropriate behavior was defined as 3 s or more of engaging in an activity other than the instructed or assigned task, leaving assigned area, engaging in vocalizations not related to the assigned task, or engaging in vocalizations during inappropriate times. Appropriate behavior was defined as 3 s or more of remaining in assigned area, engaging in assigned activity (i.e. eyes on assignment, teacher, or smartboard as appropriate) and engaging in vocalizations in an appropriate manner. These definitions were adapted from the study conducted by Eckert et al., 2005, but were modified to better fit the behaviors observed in this study.

Independent Variables. The independent variables included adult attention, peer attention, and escape from task demands. Teacher and peer attention were defined as eye contact, physical contact, or individual verbalizations or gestures from a peer or adult during the interval. Escape was defined as 10 s or more of terminating an assignment, engaging in an activity other than the assigned task (e.g. staring at assignment rather than teacher or smartboard, drawing on paper/desk), or leaving the assigned area. No consequence was defined as receiving no attention from peers or adults and participating in the assigned activity. Instances of inappropriate behavior were ignored in all phases.

Data Collection

Indirect Assessment Methods. Using the Problem Identification Interview (Bergan & Kratochwill, 1990; see Appendix D), the researcher conducted interviews with the participants' classroom teacher. This interview is designed to assess teacher concerns regarding participant behavior as well as identify and define the target problem area, estimate the severity of the behavior, obtain information regarding the environmental variables surrounding the behavior, and create a goal for behavior change. The Questions About Behavioral Function (QABF; Matson & Vollmer, 1995; see Appendix E) was also conducted by the classroom teacher and used to identify potential functions of the targeted behavior. The QABF consists of a standardized scale designed to identify variables in an environment that may be maintaining problem behavior and has been shown to be the most promising scale in its area (Matson, Tureck & Reiske, 2012). The school counselor conducted the Student-Assisted Functional Assessment Interview (SAFAI; see Appendix F) with the participants. This interview was created specifically

for educational settings and the student is the primary source of information (Kern et al., 1994). The information was compiled to identify antecedent, consequent and environmental variables that may be adjusted to better meet student needs and help address any behavioral concerns. The QABF and SAFAI were evaluated post-hoc to determine any potential variables that could relate to the findings of the analysis.

Direct Observation Methods. The researcher used frequency count to code appropriate and inappropriate behavior as well as the consequences provided throughout the observation. Sequences were preserved using 10 s intervals during each 20 min observation session.

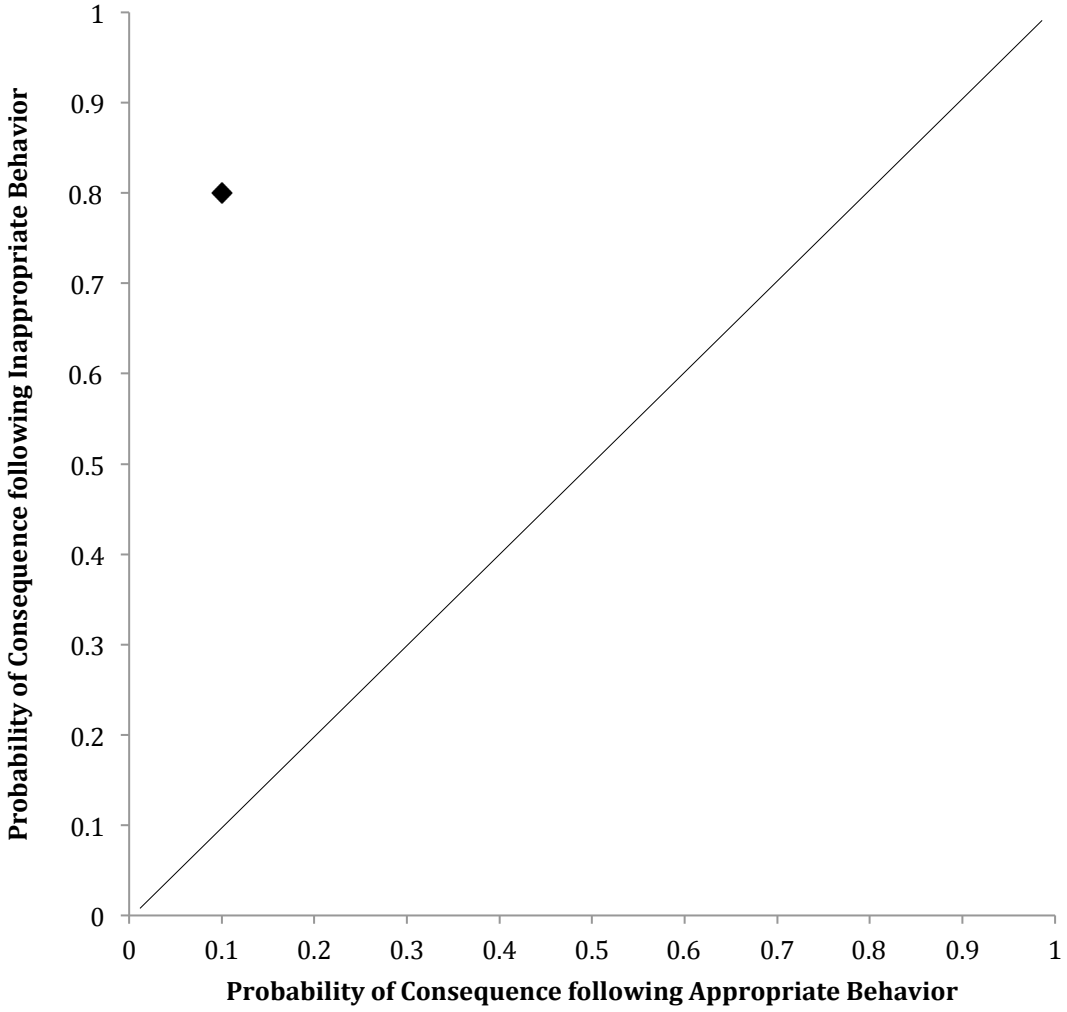
Appropriate and inappropriate behaviors, as well as consequences were coded as they occurred during each interval. Behaviors and consequences were coded in sequence using numbers. For example, if inappropriate behavior occurred, it was coded as '1', if teacher attention followed, it was coded as '2', if appropriate behavior then occurred, it was coded as '3'. When a behavior and a consequence both occurred for the entire interval, the behavior was recorded as '1', while the consequence was recorded as '2' to preserve the sequence.

Sequence of activities. The researcher conducted the PII with the classroom teacher for each participant that was identified. The teacher then conducted the QABF for each participant and the school counselor conducted participant interviews using the SAFAI. Following the indirect methods of data collection, baseline data were collected during three 20 min observation sessions, and were later graphed within the general operant contingency space. There was no interaction between the observer and the

participants. These data were not immediately analyzed so the coder would be blind as to the results of the CSA. Following the initial three observation sessions, the intervention conditions began. During these conditions, three consequent-based interventions were alternated in random sequence and each was implemented three times, with a no-consequence condition also occurring. Following implementation of the intervention conditions, the descriptive data were graphed within the general operant contingency space.

Calculating the CSA. The researcher calculated the total intervals of off-task and on-task behavior for each participant, as well as intervals of teacher attention, peer attention, and escape. The conditional probabilities were calculated by dividing the number of times a behavior was followed by a consequence by the total number of times in which a behavior occurred. For example, if off-task behavior (B) occurred a total of 15 times and was followed by the consequence of attention (C) 12 of those times, the probability of the student receiving attention following off-task behavior would be (B followed by C)/B or 12/15 which equals .80. This indicates that the probability of a student receiving attention following off-task behavior is 80%. If on-task behavior (D) occurred a total of 80 times and was followed by the consequence of attention (C) 8 of those times, the probability of the student receiving attention following on-task behavior would be (D followed by C)/D or 8/80 which equals .10. This indicates the probability of a student receiving attention following on-task behavior is 10%. These probabilities were then graphed within the general operant contingency space (Figure 3).

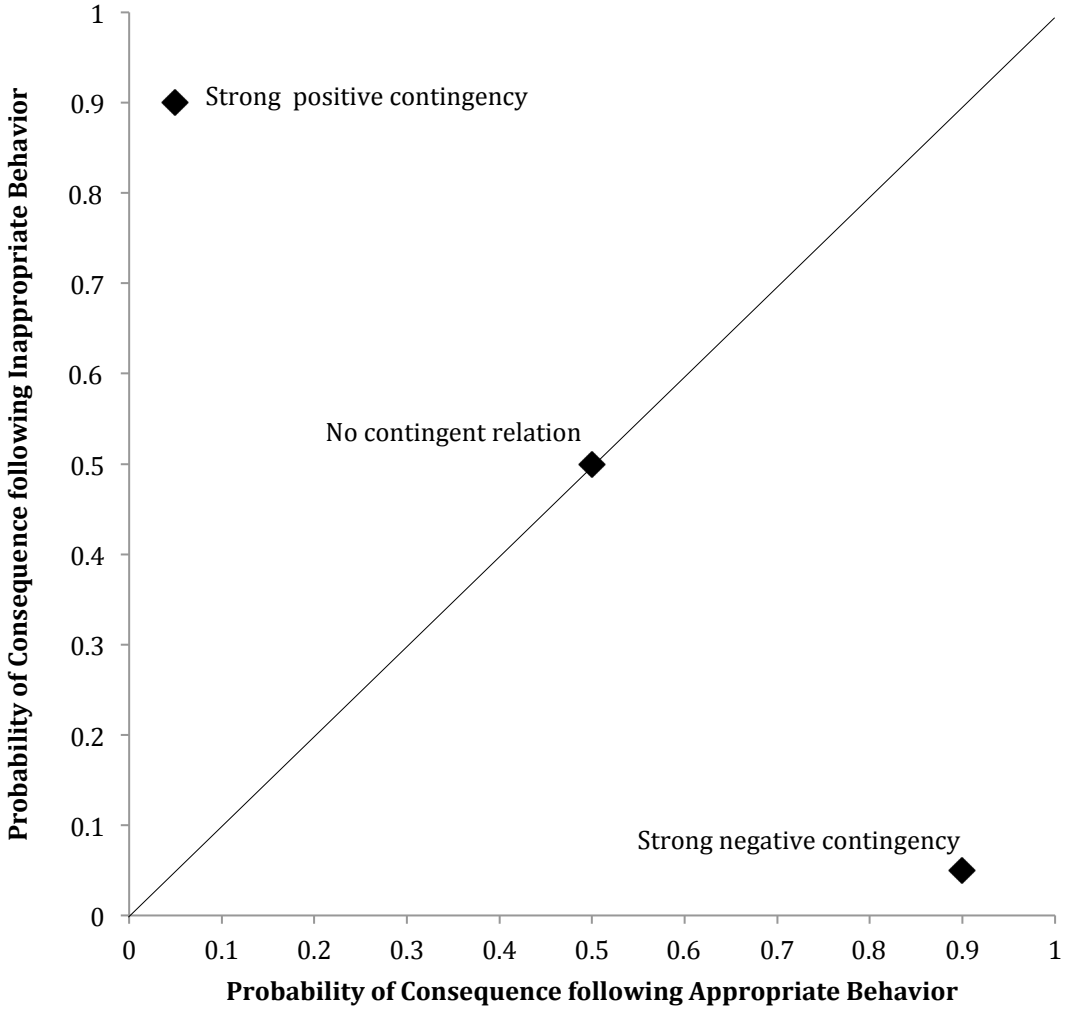
Figure 3. Example Operant Contingency Space



By calculating conditional probabilities, the probability of a teacher providing attention for problem behavior can be compared against the probability of the teacher providing attention in the absence of the student's problem behavior. The two conditional probabilities can then be plotted graphically to illustrate the strength of the relation between teacher and student behavior. For example, if a teacher provides attention to a student only when the student displays a target behavior, but never in the absence of the

target behavior, a strong positive contingency of 1.0 exists (dependent relation). If the teacher is equally likely to provide attention both in the presence and absence of the target behavior, a contingency of 0 exists, indicating no contingent relation (contiguous relation). A negative contingency exists if the teacher attention is less likely to occur following target behavior than in its absence. Figure 4 shows a graphic analysis of three contingent relations. A CSA graphic analysis of no contingent relation, or contiguous relation, shows a data point directly on the diagonal line, or unity diagonal, of the graph. Additionally, a strong positive contingency is graphed in the upper left quadrant of the graph, while a strong negative contingency is graphed in the lower right quadrant.

Figure 4. Graphic Analysis of Contingent Relations



Inter-Observer Agreement and Fidelity

A graduate researcher coded behavior and consequences during 100% of observations, during baseline and intervention conditions. An additional graduate researcher, also trained in the recording procedures, coded student behavior and consequences during 25% of observations for each participant to assess inter-observer agreement (IOA). The two researchers simultaneously but independently observed the student from different vantage points in the classroom. The results were calculated and

compared to assess IOA. The percentage of agreement (agreements/(agreements + disagreements) X 100) during the observation was calculated. IOA ranged from 80.8%-93.3% with an average of 88.8%.

The researcher assessed fidelity of intervention implementation by observing the classroom teachers implementing the intervention during the first session of each intervention for each participant. A fidelity checklist for each intervention was developed and included an outline of the steps required for each intervention (see Appendix G). There were six steps for the escape and peer attention conditions and seven steps for the adult attention condition. Steps that were not applicable were not included in the calculations. Fidelity of intervention implementation was collected during 33% of intervention sessions. The classroom teacher implemented interventions with an average of 98% fidelity ranging from 93%-100%. Verbal feedback on the fidelity of implementation was given to the classroom teacher following each class period, as well as recommendations via email. These recommendations were based on the results of the fidelity checklist completed during the initial intervention implementation.

Design

The researcher used a single-subject multi-element design with each participant by implementing three intervention conditions in random sequence to target the functions of adult attention, peer attention, and escape from task demands. A no-treatment condition was also included as a control condition. These conditions were each randomly implemented, one per day, three times each across no more than 20 total school days to test the results of the hypothesis derived from the CSA. Each condition lasted for one

instructional period throughout the study and the intervention with the greatest effect was then recommended to continue in the classroom on an ongoing basis.

Percentages of appropriate and inappropriate behavior during each intervention condition were calculated using partial interval recording and were compared to those calculated during the baseline and no consequence sessions. The intervention that produced the greatest decrease in inappropriate behavior was recommended to the teacher for continued use in the classroom. This intervention was also compared to the results of the CSA to determine the degree to which a CSA predicted effective interventions for challenging behavior of middle school students in a general education classroom.

Intervention Procedures

The intervention procedures were designed to reverse the contingent relation between the problem behavior and a potential reinforcing consequence. For example, if it was hypothesized that a student's behavior was maintained by teacher attention, the attention was only available when the student engaged in appropriate behavior. All instances of inappropriate behavior were ignored.

The teacher attention intervention consisted of the teacher providing the student with attention contingent on appropriate behavior. The teacher was asked to provide the student with positive feedback, either verbally or nonverbally. The rate at which the feedback was given was based on baseline observations. It was calculated based on the initial observations and rate of reinforcement previously provided by the teacher. For example, if the teacher had previously provided attention for inappropriate behavior twice

per min, the teacher was asked to provide attention for appropriate behavior twice per min, while ignoring instances of inappropriate behavior.

The peer attention intervention consisted of the teacher informing the student of the amount of time he or she must engage in appropriate behavior in order to spend time with a preferred peer. The time required to engage in appropriate behavior was based on baseline observations. The teacher tracked appropriate behavior by giving the student tally marks during periods of appropriate behavior. If the student received the required number of tally marks, they were given time with a peer at the end of the class period. During the class time, the class was instructed to ignore instances of inappropriate behavior of all students.

The escape condition consisted of the teacher providing breaks from task demands contingent on appropriate behavior. The time required to engage in appropriate behavior was based on baseline observations. The teacher tracked appropriate behavior by giving the student tally marks during periods of appropriate behavior. If the student received the required number of tally marks, they were given a break from classwork. During the class time, the class was instructed to ignore instances of inappropriate behavior of all students.

Chapter 4

RESULTS

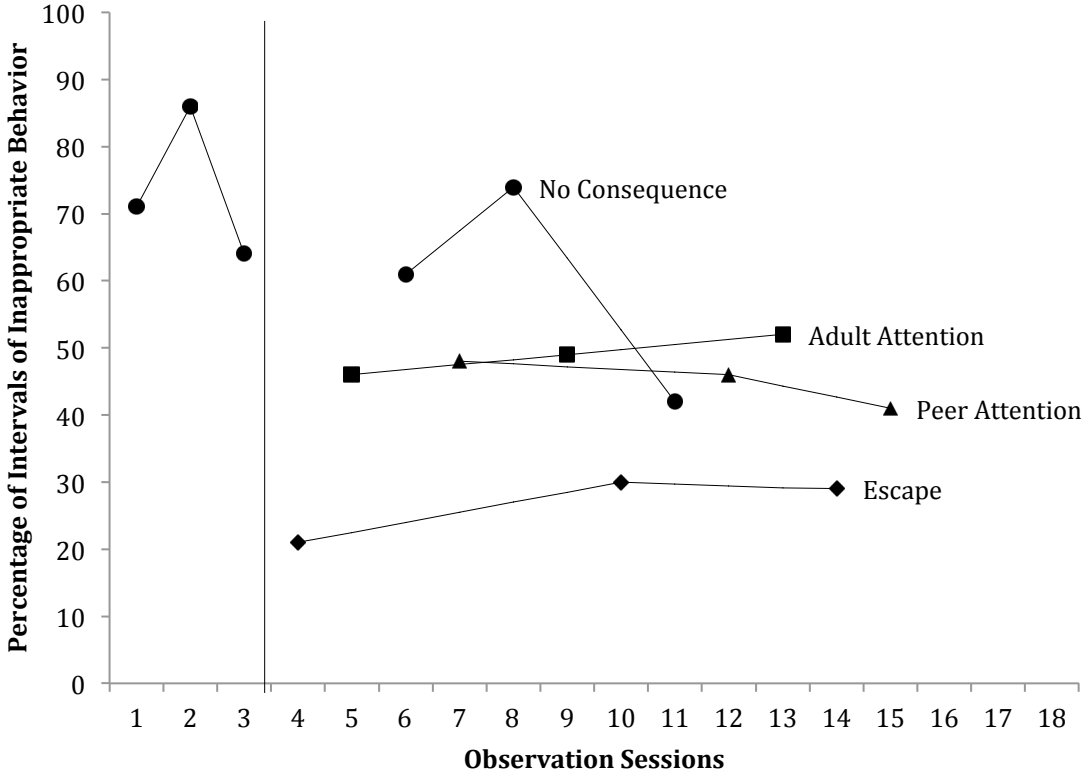
The purpose of this study was to extend research in the use of CSA as a potential method of developing hypotheses regarding the functions of challenging behavior of middle school students. The specific research question that was addressed was as follows:

> To what degree can a CSA be used as a tool in predicting effective intervention for challenging behavior of middle school students in a general education classroom?

Results of the implemented interventions were graphed and displayed in figures 5, 7, 9 & 11. The probabilities of each potential consequence, given the presence or absence of target behaviors were calculated and graphed in a contingency space analysis (figures 6, 8, 10 &12) for each participant. The school counselor conducted a Student Assisted Functional Assessment Interview (SAFAI; Kern et al., 1994) with each student prior to initial observations. The classroom teacher also completed the Questions About Behavioral Function (QABF; Matson & Vollmer, 1995) prior to initial observations. Results of both the SAFAI and the QABF are described below.

Sahal. During the SAFAI, Sahal indicated that people and objects in his classroom are often distracting to him. He stated that he enjoys math at times but gets more distracted in math class than any other class. Results of the QABF suggested that escape from task demands is a likely reinforcer of inappropriate behavior for Sahal.

Figure 5. Intervention Results for Sahal



Results of the intervention conditions for Sahal are displayed in figure 5. The average percentage of intervals Sahal engaged in inappropriate behavior prior to implementation of the intervention was 74%. Although all interventions resulted in a decrease of inappropriate behavior relative to baseline, the greatest and most consistent decrease of inappropriate behavior was observed during sessions in which the escape from task demands intervention was implemented. During the escape conditions, inappropriate behavior decreased from 74% of intervals to 27% of intervals. During the adult attention conditions, inappropriate behavior decreased to 49% of intervals. During the peer attention conditions, inappropriate behavior decreased to 45% of intervals.

During the conditions in which no consequences were given, inappropriate behavior decreased to 59% of intervals.

Figure 6. CSA Results for Sahal

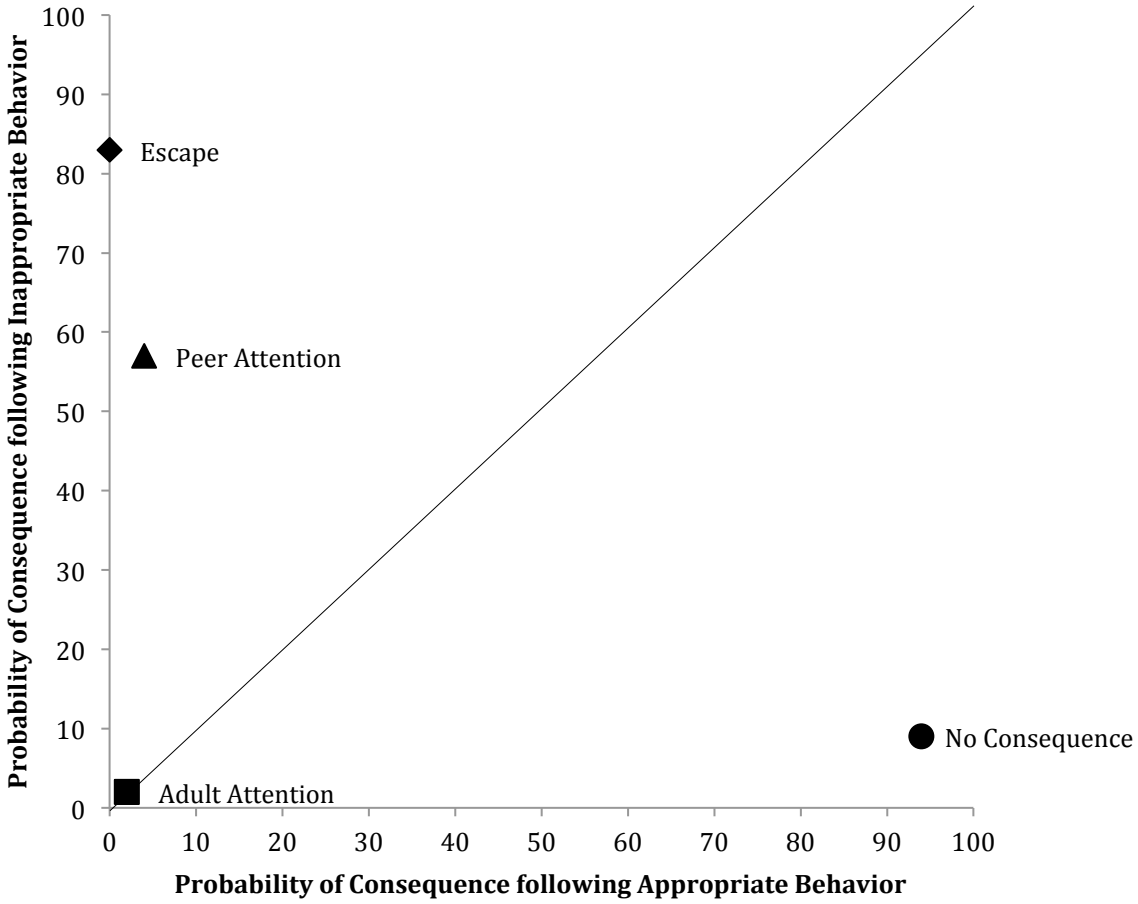


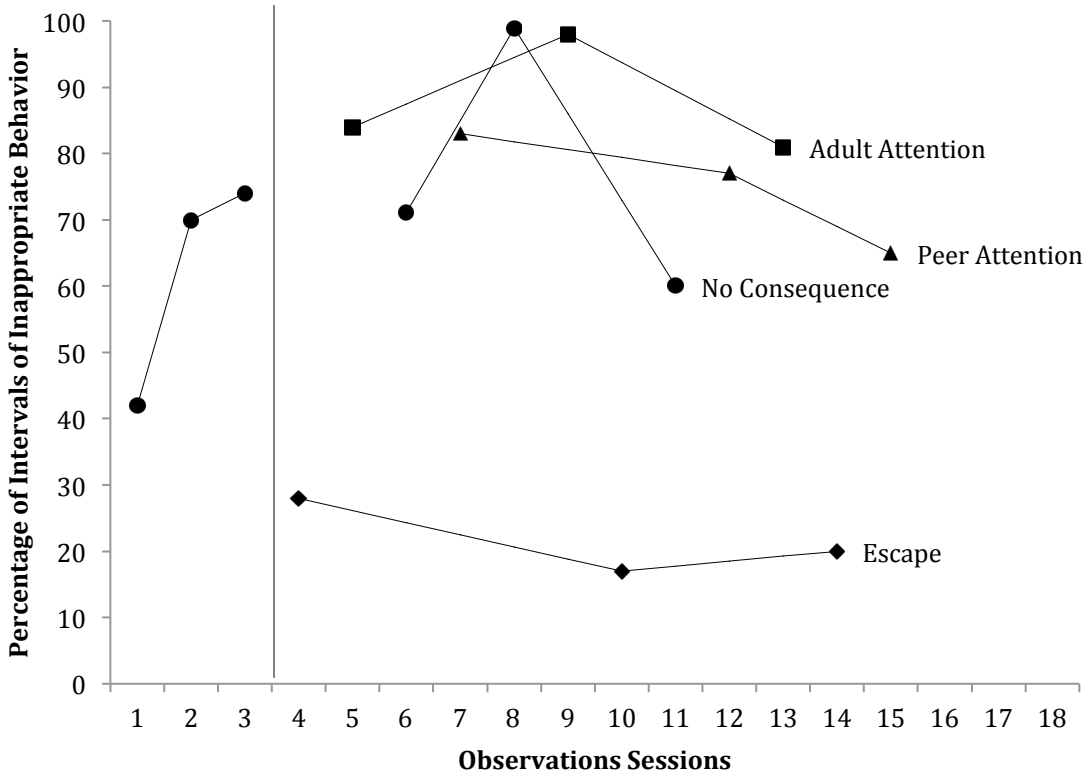
Figure 6. Probabilities of consequences following appropriate and inappropriate behavior are displayed as percentage calculations.

Figure 6 shows the results of the CSA for Sahal. The probability of Sahal receiving adult attention following inappropriate behavior was 2%, and the probability of him receiving adult attention following appropriate behavior was also 2%. The probability of Sahal receiving peer attention following inappropriate behavior was 57%,

and the probability of him receiving peer attention following appropriate behavior was 4%. The probability of Sahal receiving escape from task demands following inappropriate behavior was 83%, and the probability of him receiving escape from task demands following appropriate behavior was 0%. Results of the CSA for Sahal show that although escape and peer attention both occurred following inappropriate behavior, the probability of escape occurring was higher than the probability of the participant receiving peer attention for his inappropriate behavior. This lead to a hypothesis of negative reinforcement in the form of escape from task demands for this participant, supporting the intervention results in figure 5.

DeShawn. During the SAFAI, DeShawn indicated that he gets very distracted by people and events in his classroom. He stated that he enjoys math, but has a hard time focusing in his math class. Results of the QABF suggested that attention is a likely reinforcer of inappropriate behavior for DeShawn, and to a lesser extent, escape from task demands.

Figure 7. Intervention Results for DeShawn



Results of the intervention analysis with DeShawn are displayed in figure 7. The average percentage of intervals DeShawn engaged in inappropriate behavior prior to implementation of the interventions was 62%. The sessions in which the escape from task demands intervention was in place resulted in the greatest decrease of inappropriate behavior across all conditions with no overlapping data. During the escape sessions, inappropriate behavior decreased from 62% of intervals to 22% of intervals. During the adult attention condition, inappropriate behavior increased to 88% of intervals. During the peer attention condition, inappropriate behavior increased to 75% of intervals. During the condition in which no consequences were given, inappropriate behavior increased to 77% of intervals. Inappropriate behavior during the escape interventions dropped to

below 30%, whereas inappropriate behavior during the adult and peer attention conditions remained consistent with data collected during the baseline observations and no consequence conditions.

Figure 8. CSA Results for DeShawn

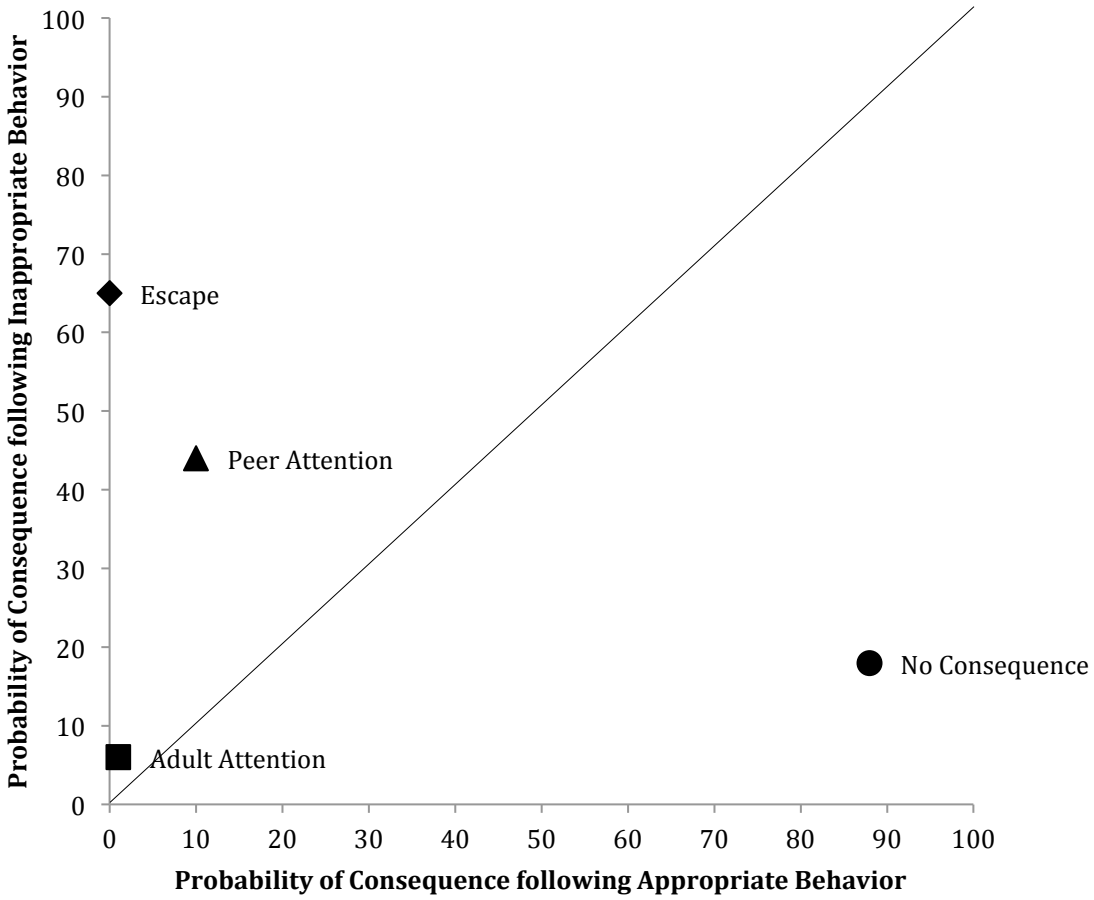


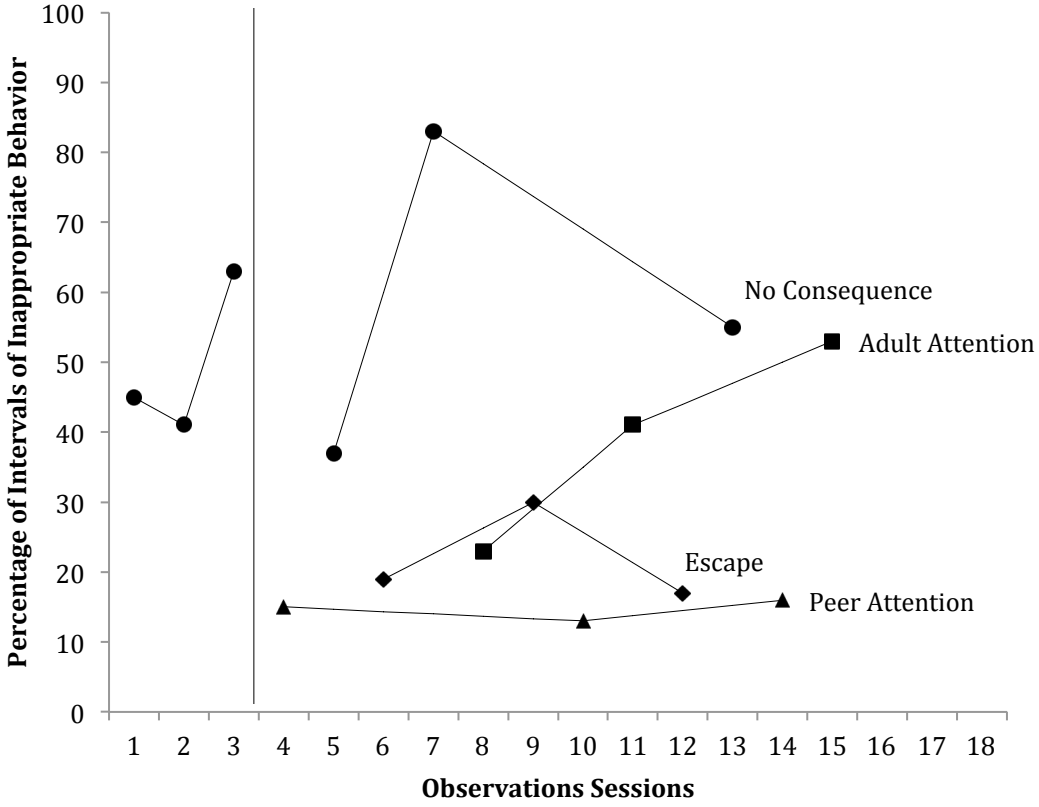
Figure 8. Probabilities of consequences following appropriate and inappropriate behavior are displayed as percentage calculations.

Figure 8 shows the results of the CSA for DeShawn. The probability of DeShawn receiving adult attention following inappropriate behavior was 6%, and the probability of him receiving adult attention following appropriate behavior was 1%. The probability of

DeShawn receiving peer attention following inappropriate behavior was 44%, and the probability of him receiving peer attention following appropriate behavior was 10%. The probability of DeShawn receiving escape from task demands following inappropriate behavior was 65%, and the probability of him receiving escape from task demands following appropriate behavior was 0%. Inappropriate behavior was most likely followed by escape from task demands. These results suggested that inappropriate behavior was being negatively reinforced by escape from task demands. The hypothesis developed based on the CSA was confirmed during the intervention phase in figure 7.

Raul. During the SAFAI, Raul indicated that he is very distracted by peers in his classroom, and that he is much more distracted in the mornings (which is when his math class occurs) than in the afternoons. He reported that he hates math in general and is more interested in talking to his friends during this time than working on his assigned tasks. Results of the QABF indicated that escape from task demands is a likely reinforcer of inappropriate behavior for Raul, and to a lesser extent, attention from others.

Figure 9. Intervention Results for Raul



Results of the intervention analysis with Raul can be seen in figure 9. The average percentage of intervals Raul engaged in inappropriate behavior prior to implementation of the intervention was 50%. Although all interventions resulted in a decrease of inappropriate behavior, the sessions in which the peer attention intervention was implemented resulted in the greatest decrease of inappropriate behavior across all sessions with no overlapping data. During the peer attention condition inappropriate behavior decreased from an average of 50% of intervals to 15% of intervals. During the escape condition, inappropriate behavior decreased to 22% of intervals. During the adult attention condition, inappropriate behavior decreased to 39% of intervals. During the condition in which no consequences were given, inappropriate behavior increased to 58%

of intervals. During the intervention sessions, inappropriate behavior decreased during both the peer attention and escape conditions, with one session during the adult attention phase resulting in a decrease of inappropriate behavior.

Figure 10. CSA Results for Raul

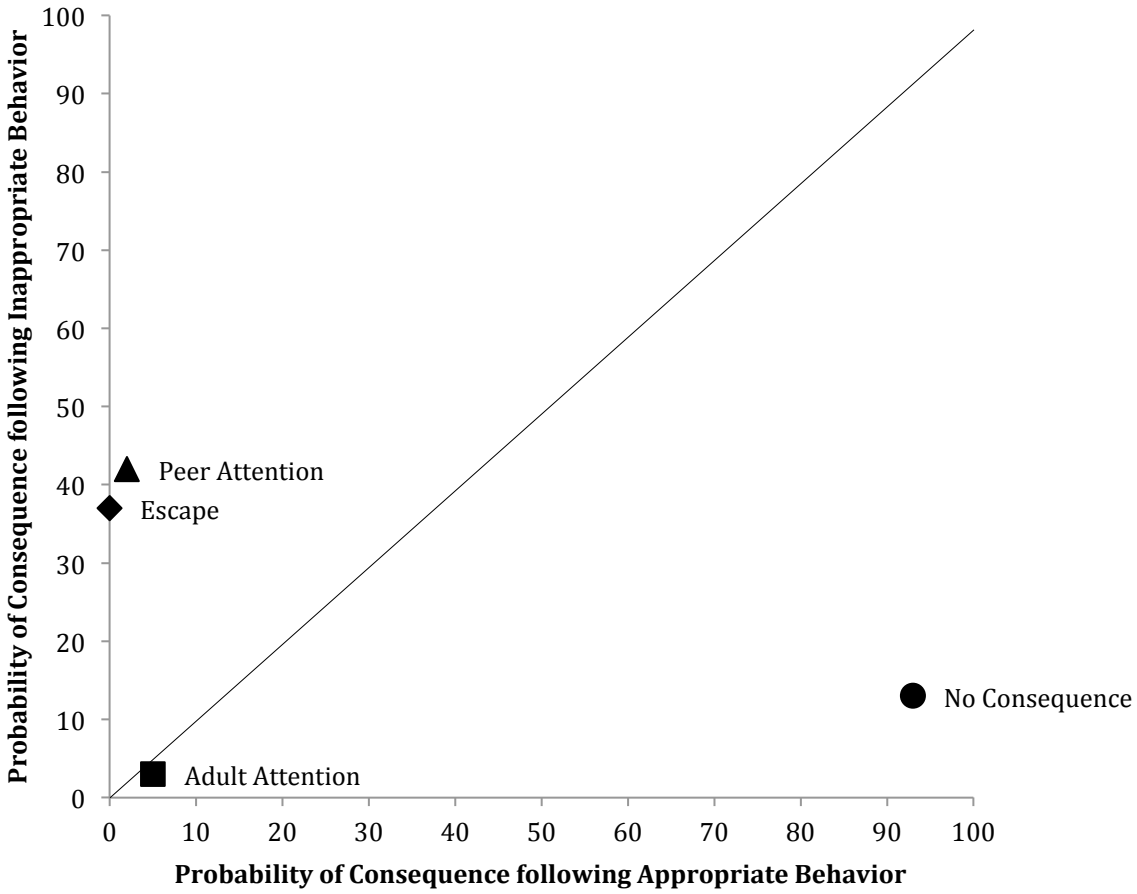


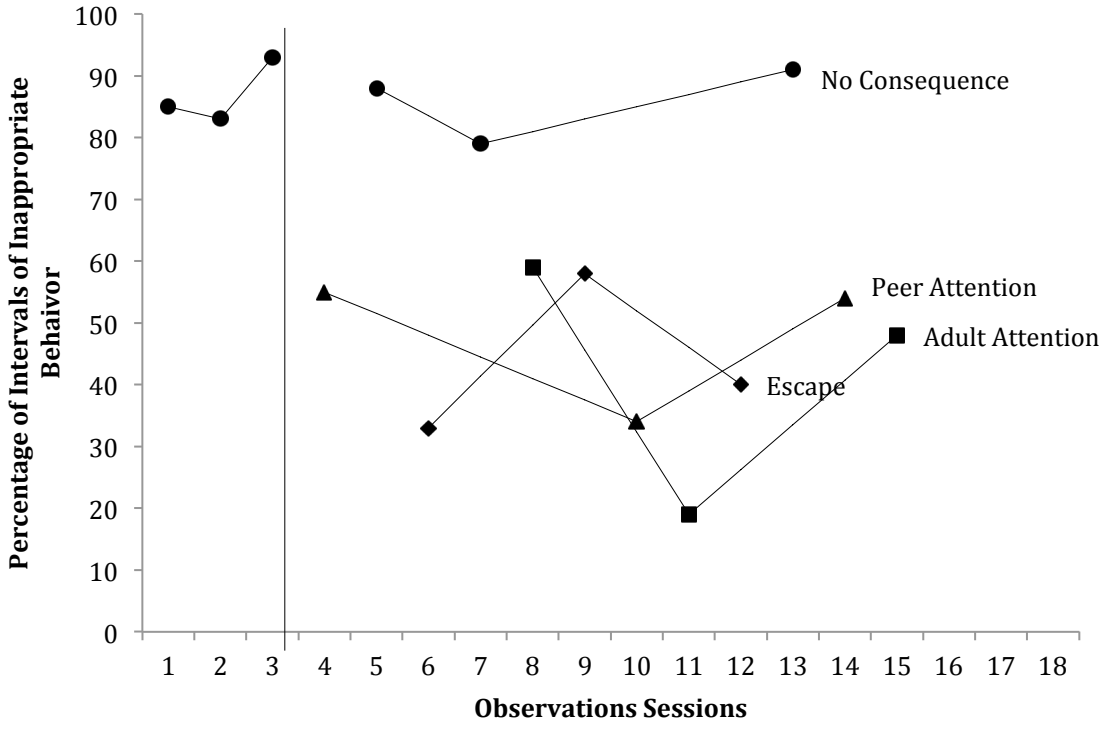
Figure 10. Probabilities of consequences following appropriate and inappropriate behavior are displayed as percentage calculations.

Figure 10 shows the results of the CSA for Raul. The probability of Raul receiving adult attention following inappropriate behavior was 3%, and the probability of him receiving adult attention following appropriate behavior was 5%. The probability of

Raul receiving peer attention following inappropriate behavior was 42%, and the probability of him receiving peer attention following appropriate behavior was 2%. The probability of Raul receiving escape from task demands following inappropriate behavior was 37%, and the probability of him receiving escape from task demands following appropriate behavior was 0%. The CSA for Raul showed that escape from task demands and peer attention were almost equally as likely to occur following inappropriate behavior, with peer attention being slightly more likely. Based on these results, it was hypothesized that both escape and peer attention were reinforcing inappropriate behavior. This was supported during the intervention sessions in figure 9.

Antony. During the SAFAI, Antony reported that he is very distracted by friends in his classroom. He also indicated that he hates math and would rather engage in social interactions with his peers during this time. Results of the QABF indicated that attention is a likely reinforcer of inappropriate behavior for Antony, and to a lesser extent, escape from task demands.

Figure 11. Intervention Results for Antony



Results of the intervention analysis with Antony can be seen in figure 11. The average percentage of intervals Antony engaged in inappropriate behavior prior to implementation of the intervention was 87%. Although all interventions resulted in a decrease of inappropriate behavior, there was no differentiation between the conditions. During the adult attention condition, inappropriate behavior decreased from 87% of intervals to 42% of intervals. During the peer attention condition, inappropriate behavior decreased to 48% of intervals. During the escape condition, inappropriate behavior decreased to 44% of intervals. During the sessions in which no consequences were given, inappropriate behavior remained stable at 86% of intervals. Results from the intervention sessions indicated that inappropriate behavior decreased relative to baseline during all

intervention conditions, with the greatest decrease occurring during the teacher attention condition in which the teacher provided positive reinforcement contingent on appropriate behavior throughout the class period. This suggests that regardless of the function of Antony's behavior, any of the three rewards offered were successful in decreasing inappropriate behavior.

Figure 12. CSA Results for Antony

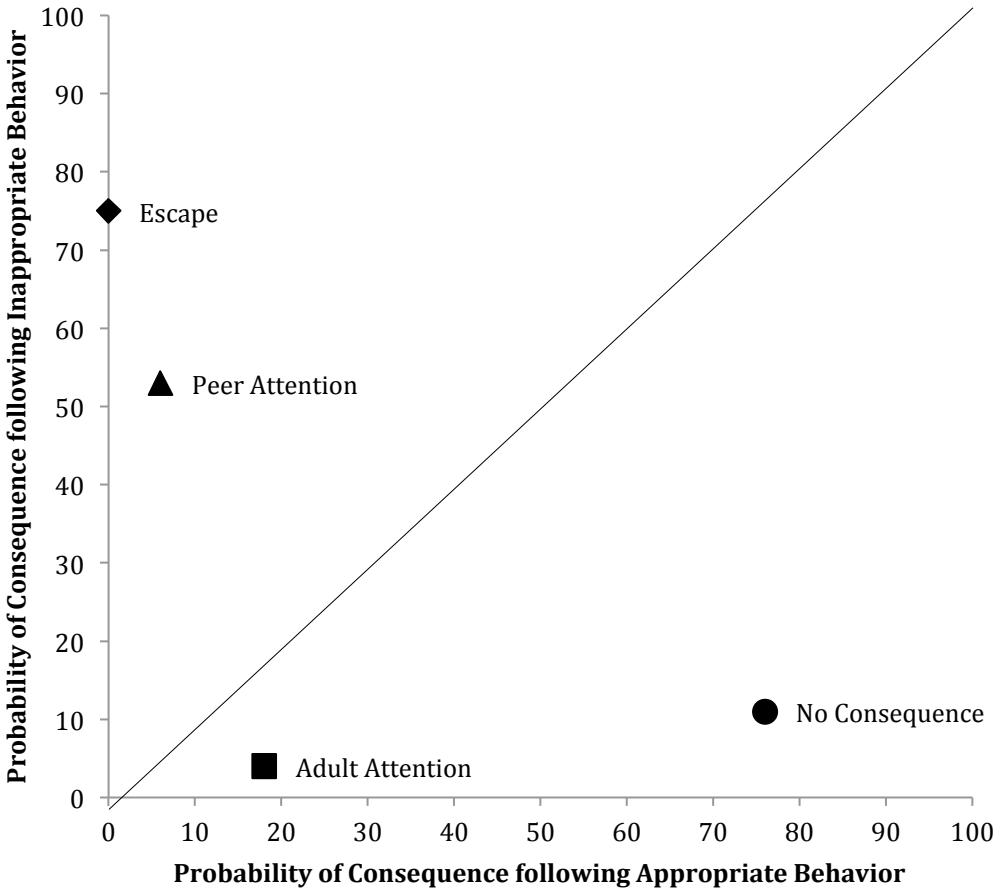


Figure 12. Probabilities of consequences following appropriate and inappropriate behavior are displayed as percentage calculations.

Figure 12 shows the results of the CSA for Antony. The probability of Antony receiving adult attention following inappropriate behavior was 4%, and the probability of him receiving adult attention following appropriate behavior was 18%. The probability of Antony receiving peer attention following inappropriate behavior was 53%, and the probability of him receiving peer attention following appropriate behavior was 6%. The probability of Antony receiving escape from task demands following inappropriate behavior was 75%, and the probability of him receiving escape from task demands following appropriate behavior was 0%. Visual examination of the CSA for Antony showed that escape from task demands was more likely to occur following inappropriate behavior than appropriate behavior, and at a higher rate than peer or teacher attention. Results from this CSA indicated that escape from task demands was the probable function of the inappropriate behavior, with peer attention being possible but less likely.

Summary of results. Table 1 highlights the results of the QABF, CSA, and intervention sessions for each participant. The QABF indicated that attention was potentially reinforcing inappropriate behavior for DeShawn, but this was not evident in the CSA and intervention sessions. Had the QABF been used in isolation for DeShawn, an inappropriate intervention might have been developed. Similarly, attention was not noted as a possible function for inappropriate behavior for Raul, but results of the CSA and intervention sessions both indicated that peer attention was reinforcing the inappropriate behavior. The QABF and the CSA indicated differing results for Antony and results from the intervention phases were inconclusive. This may suggest that

multiple functions exist for this participant, or there may have been additional variables that were not targeted.

Table 1

Results of QABF, CSA, and Interventions

	QABF	CSA	Interventions
Sahal	Escape	Escape	Escape
DeShawn	Attention/Escape	Escape	Escape
Raul	Escape	Peer Attention/ Escape	Peer Attention/ Escape
Antony	Attention	Escape	Inconclusive

Note. The QABF does not distinguish between types of attention (i.e. peer and teacher).

Table 2 illustrates the percentage of intervals in which inappropriate behavior occurs during each condition for the participants. Results of the CSAs indicated escape as a likely function of inappropriate behavior for all four participants with a second possible function of peer attention for three participants. The greatest decrease in inappropriate behavior occurred during the escape condition for Sahal and DeShawn. A decrease in inappropriate behavior can also be seen during the peer attention intervention condition for Raul, whose CSA indicated peer attention as a second potential function. These data lend credence to the idea of using a CSA as a tool for predicting effective interventions for challenging behavior of middle school students in a general education classroom. However, results for Antony are inconclusive. The CSA indicated escape as a clear likely function of inappropriate behavior for Antony, and although inappropriate behavior

decreased during all intervention conditions, the greatest decrease in inappropriate behavior occurred during the teacher attention intervention condition.

Table 2

Average percentage of intervals of inappropriate behavior

	Baseline	Teacher Attention	Peer Attention	Escape	No Consequence
Sahal	74	49	45	**27**	59
DeShawn	62	88	75	**22**	77
Raul	50	39	**15**	22	58
Antony	87	**42**	48	44	86

Note. Conditions in which the greatest decreases in inappropriate behavior are seen are highlighted.

Chapter 5

Discussion

Summary of Findings

This study was designed to determine the degree to which a CSA can be used as a tool in predicting effective intervention for challenging behavior of middle school students in a general education classroom. The interventions that were based on the results of the CSA were effective in decreasing inappropriate behavior for three out of four participants. The inappropriate behavior of the fourth participant decreased during all interventions, leading to inconclusive results. These results are promising and indicate that a CSA can aid in predicting effective intervention in a general education setting. Further, these results support the previous findings of Eckert et al., 2005 in which three hypothesis-based interventions were implemented with a typically developing 7 year-old student. The effects of these interventions supported the results from the CSA.

In comparing the results of the CSAs to the results of the QABF, the same function was only identified for one participant. Both the CSA and the QABF suggested escape as the function of Sahal's behavior and results from the intervention analysis indicated escape as the function as well. Results for DeShawn showed two potential functions (i.e. attention and escape) on the QABF but escape was the only function supported by the CSA and intervention analysis. Results from the QABF for Raul show escape as the hypothesized function of his behavior, but the CSA indicated two potential functions (i.e. peer attention and escape). The peer attention intervention resulted in the greatest decrease of inappropriate behavior for Raul. Results from the QABF for Antony

indicated that attention may be hypothesized as the function of his behavior, however the CSA indicated that escape was the most likely function. Results from the interventions showed a decrease of inappropriate behavior in all conditions, with adult attention being a slightly greater decrease than peer attention or escape. The results are noteworthy because although attention was indicated as a potential function of inappropriate behavior for two participants, the QABF does not distinguish between peer attention and teacher attention. If the QABF was used in isolation, interventions for DeShawn and Raul may not have been as successful.

Implications for Practice

Research supporting the use of CSAs as tools in behavioral assessments has been conducted within the elementary school setting (Eckert et al., 2005, Martens et al., 2010), indicating that CSAs can be completed in a classroom environment. CSAs require minimal observations, and no manipulation of antecedents or consequences. Therefore, with appropriate consultation on the procedures required to conduct a CSA, school personnel could use this method to assist with identifying effective interventions for student with persistent patterns of inappropriate behavior. This method may be particularly useful with middle school students due to the restrictions in their class schedules. Middle school students receive instruction in multiple classrooms, and with multiple teachers throughout each day. The large number of changing variables throughout a student's day makes it challenging to accurately address these behaviors in each setting in which they occur. This tool could potentially be used in multiple classrooms to determine whether multiple functions are present in various settings.

Additionally, a CSA could be used to increase teacher awareness as to the need for class-wide interventions.

Sugai and Horner (2006) estimated that approximately 5% of all school-age students require intensive individual supports for behavior. With this many students in need of additional behavioral supports, results of this study offer educators a valuable tool to aid in these assessments so that effective interventions can be implemented with students who are struggling with inappropriate behavior in school. A CSA has the potential to lead to more accurate results when conducting FBAs in a school setting, without the use of more resource intensive methods such as functional or structural analyses that require systematic isolation and manipulation of variables. By addressing the functions that maintain challenging behavior with middle school students and providing these students with more appropriate means of obtaining reinforcement, it may be possible to increase psychological and behavioral academic engagement. Engagement is a significant predictor in future academic success (Dotterer & Lowe, 2011); thus increasing engagement may lead to more successful outcomes for students who otherwise may have not be expected to succeed in school.

Implications for Research

Although results from this study support previous research (Eckert et al., 2005) for using CSAs as a tool for identifying effective interventions for inappropriate behavior of students in a school setting, there are several areas in which the research could be strengthened. First, extending this study to include multiple teachers and multiple classes would provide additional information on the settings and populations that could benefit

from the use of a CSA. The independent variable of teacher attention may vary with each individual teacher and could have a different impact in a class where more student-teacher interaction takes place.

Second, multiple functions could be addressed as research shows that more successful outcomes occur when all behavioral functions are addressed (Hoff et al., 2005). Research into the effects of addressing multiple functions when both are represented in the CSA may provide valuable information on the use of this tool in predicting effective interventions. For instance, when two possible functions are identified, as in the case of Raul, a more successful outcome might occur if both functions are targeted simultaneously (Bachmeyer, Piazza, Fredrick, Reed, Rivas, & Kadey, 2009; Hoff et al., 2005).

Third, additional research on the significance of values within the contingency space and their implication on student behavior is necessary to understand the full potential of using a CSA in the functional assessment process. It is unknown the degree to which placement of a data point within the CSA affects the development of an accurate hypothesis. For example, the distance a data point is from the unity diagonal may have an impact on the strength of the hypothesis. The higher a data point is on the y-axis, the stronger the contingency, and based on the results of this study, the stronger the hypothesis. Also, distance between the data point and the unity diagonal plays a large part in the strength of a hypothesis as well. If a data point is close to the unity diagonal, the contingency is weaker and the probability of reinforcement following inappropriate and appropriate behavior may be more equal (Vollmer et al., 2001).

Fourth, future research could investigate distinguishing between escape and attention during direct observations. Although a student may be receiving attention during inappropriate behavior, the primary function may actually be escape from task demands. Escape and attention were not coded as mutually exclusive, making it difficult to distinguish between these two potential functions. This should be taken into consideration when creating operational definitions and conducting direct observations during future research.

Limitations

Although the results of this study are promising, several limitations should be noted. First, these interventions were implemented within a single math class with the same teacher for each individual participant. Additionally, teacher attention rarely occurred in the presence of appropriate or inappropriate behavior. Generalization to additional classes or fidelity of implementation with additional teachers was not assessed and it is unknown whether other participants with different teachers would have similar results with regard to teacher attention. This teacher was able to provide reinforcement during each intervention phase due to the structure of the class, but this may not be possible in all classrooms depending on the class and teacher. Also, different functions may be present in different classrooms depending on the subject material and peers in each class.

Second, research using the CSA is limited and there are no absolute guidelines for interpreting the data in the contingency space. It is unknown what the impact of the distance of the data point from the unity diagonal may be for interpreting results or

predicting effective intervention. Results of this study seemed to indicate that the higher the data point sat in the y-axis, the more likely that function was the correct hypothesis; however, there is limited data to support that conclusion.

Third, accurately assessing escape as a function of challenging behavior using the CSA proved challenging. The definitions for attention and escape were not mutually exclusive and often resulted in both consequences occurring simultaneously. This could have resulted in inaccurate rates of either consequence. For instance, if the participant was engaging in conversation with a peer, this would be recorded as both peer attention and escape. However, it may have been that the participant merely engaged with the peer as a means to escape and the peer attention was not a necessary element.

Fourth, a fidelity checklist was completed during the first implementation of each intervention for each participant. This resulted in fidelity checks during 33% of sessions; however, fidelity was not assessed throughout the remainder of the observation sessions. It may be possible that the interventions were not implemented with a high degree of fidelity throughout the study.

Finally, these interventions were not continued following termination of the study due to the fact that the study did not conclude until the end of the school year. Therefore, it is unknown whether the results would have been sustained without continued direct observations within the classroom, or whether the results would have carried over to the following school year.

Conclusion

This extension of Eckert et al., 2005 provides the field of functional assessment with additional support for a technique that can be used to inform hypotheses for challenging behavior of middle school students within the general education classroom. In addition to their regular duties, school personnel need to be able to conduct an FBA that delivers precise and usable information with minimal time and effort (Horner, 1994; Scott et al., 2004). There are time and resource limitations associated with conducting a functional analysis (the gold standard of FBAs), but a CSA is a tool that can be used by school personnel in addition to their regular duties, and deliver precise and usable information as suggested by Horner, 1994, and Scott et al., 2004. Also, the research supporting the use of a CSA is growing. Martens, Gertz, Werder, Rymanowski, & Shankar (2014) found that operant contingency values were better suited for describing sequentially-recorded observational data than other commonly used algebraic values. Although additional research is necessary to determine the effectiveness of using a CSA for behavior with multiple functions, CSA could become a valuable tool for predicting effective behavior interventions, specifically for middle school students in a general education setting. By identifying the strength of the contingencies between behavior and the consequences that follow, and changing the reinforcement probabilities from reinforcing problem behavior, to reinforcing more desired behavior, student outcomes can improve. Addressing and changing these problem behaviors can lead to increased student engagement, higher grades, and lower drop-out rates (Klem & Connell, 2004; Montague et al., 2011).

Too often students with challenging behavior are suspended, referred for special

education services, expelled, or they drop out of school altogether (Bullock & Gable, 2006; NCES, 2009). Educators need to focus on increasing academic outcomes for all students, not just the students who display good behavior. Identifying and implementing effective interventions with students who display persistent patterns of problem behavior in school is the responsibility of all educators. Using a CSA can help with the process of identifying those effective interventions and guiding these children to more positive educational and social outcomes.

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Appendix A: Consent Form

Parental Consent Form

An Investigation Into the Validity of Using a CSA to Inform Hypotheses Regarding Student Behavior

Your child is invited to be in a research study sponsored by the University of Minnesota, Educational Psychology department. The study will use an observation technique called a contingency space analysis (CSA), which is designed to identify behavior interventions appropriate for targeting the variables associated with challenging or off-task behavior. This study will draw from children who attend public school in the twin cities, and will specifically focus upon a broad base of children who have been noted as having exhibited occasional challenging or off-task behavior during instruction. Please read this letter and ask any questions you may have before agreeing to your child's participation in the study.

This study is being conducted by Meredith Peterson, a doctoral student in Educational Psychology at the University of Minnesota. Dr. McComas who is a professor at the University of Minnesota will oversee the study.

Procedures
If you let your child be part of the study, a graduate student will observe in his or her classroom during instructional time. Calculations of the probability that a behavior will be followed by a consequence will be made based on the results of the observations. The classroom teacher will then implement 3 different strategies over a period of no more than 20 school days. Strategies will consist of providing the student with positive attention from the teacher, earning free time with a chosen peer, or a break with a preferred activity. These are strategies commonly used by classroom teachers in many schools and they will be randomly implemented by the classroom teacher. At the end of the project, the teacher will select the most effective strategy to use with each participant. The graduate student will observe your child while the interventions are being implemented to determine if the most effective intervention corresponds with the results from the CSA.

Risks and Benefits of being in the Study
There are no known risks to your child due to participating in this study. The benefits to participating in this study include potentially identifying a behavior strategy that is effective for decreasing inappropriate behavior displayed in the classroom.

Compensation
There is no compensation for participation in this study.

Confidentiality
Your child's teacher will be notified of your child's progress at the end of the study. The records of this study will be kept private. In any sort of report we might publish, we will not include any information that will make it possible to identify your child. Research records will be stored securely in a locked cabinet and/or on a secured computer. Only Meredith Peterson and Dr. McComas will have access to the records.

Voluntary Nature of the Study
Participation in this study is voluntary. Your decision whether or not to allow your child to participate will not affect your current or future relations with the University of Minnesota or your school district. If you decide to allow your child to participate, you are free to withdraw at any time without affecting those relationships.

Contacts and Questions
The researcher conducting this study is Meredith Peterson. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact Meredith Peterson at the University of Minnesota, Department of Educational Psychology, 651-206-2049, pete2606@umn.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researchers, **you are encouraged** to contact the Research Subjects' Advocate Line, D528 Mayo, 420 Delaware St. Southeast, Minneapolis, Minnesota 55455; (612) 625-1650.

You may keep this information for your records.

Appendix A: Parental Consent Form

Parental Consent Form

An Investigation Into the Validity of Using a CSA to Inform Hypotheses Regarding Student Behavior

Statement of Consent:
I have read the attached information. I have asked questions and have received answers.

I **consent** to my child's participation in the study.

Child's Name (please print) _____

Signature of parent or guardian:_____ Date: _____

I **do not consent** for my child to participate in this study.

Child's Name (please print) _____

Signature of parent or guardian:_____ Date: _____

Signature of Investigator:_____ Date: _____

Appendix B: Assent Form

Student Assent Form

An Investigation Into the Validity of Using a CSA to Inform Hypotheses Regarding Student Behavior

I, _____ agree to take place in this behavior study. I also agree to allow the researcher to look at my results from the behavioral observations for the purposes of research. I have been informed of the nature of the study and have had all of my questions answered.

_____
Student Name (Print)

_____ _____
Student Signature Date

Appendix C: Direct Observation Data Collection Form

Student					Date		Condition						Obs #
	On	Off	T Attn	P Attn	Escape	No Con		On	Off	T Attn	P Attn	Escape	No Con
:10							:10						
:20							:20						
:30							:30						
:40							:40						
:50							:50						
1:00							11:00						
:10							:10						
:20							:20						
:30							:30						
:40							:40						
:50							:50						
2:00							12:00						
:10							:10						
:20							:20						
:30							:30						
:40							:40						
:50							:50						
3:00							13:00						
:10							:10						
:20							:20						
:30							:30						
:40							:40						
:50							:50						
4:00							14:00						
:10							:10						
:20							:20						
:30							:30						
:40							:40						
:50							:50						
5:00							15:00						
:10							:10						
:20							:20						
:30							:30						
:40							:40						
:50							:50						
6:00							16:00						
:10							:10						
:20							:20						
:30							:30						
:40							:40						
:50							:50						
7:00							17:00						
:10							:10						
:20							:20						
:30							:30						
:40							:40						
:50							:50						
8:00							18:00						
:10							:10						
:20							:20						
:30							:30						
:40							:40						
:50							:50						
9:00							19:00						
:10							:10						
:20							:20						
:30							:30						
:40							:40						
:50							:50						
10:00							20:00						

Appendix D: Problem Identification Interview

Problem Identification Worksheet

Child: _____

The purposes of the **Problem Identification Worksheet** are to:

- Define the problem(s) in behavioral terms.
- Provide a tentative identification of behavior in terms of antecedent, situation, and consequent conditions.
- Provide a tentative strength of the behavior (e.g., how often or severe).
- Establish a procedure for the collection of baseline data in terms of the sampling plan and what behavior is to be recorded, who is to record it, and how it is to be recorded.
- To begin to determine the functional aspects of the behavior.

1. **General statement to begin clarifying the concern**: (e.g., "Describe Diane's hyperactive behavior,").

2. **Behavior specification**: (e.g., "What does Charles do when he is hyperactive?" or "What does Mary do when she is disrespectful?" A precise description of the behavior of concern to the consultee. As for as many examples of the problem behavior as possible).

a. Specify examples:

b. **Specify priorities** (After eliciting all the examples that the consultee can give, ask which behavior is causing the most difficulty and establish a priority.):

3. **Setting events**: (a precise description of the settings in which the problem behaviors occur, e.g., "Where does _____ do this?").

a. Specify examples (e.g., home, where in home):

Important: Ask for as many examples of settings as possible.

b. Specify priorities:

Important: After eliciting all the examples that the consultee can give, ask which setting is causing the most difficulty and establish priorities.

4. **Identify antecedents**: What happens right before the problem behavior occurs? (e.g., "What happens before Mary makes an obscene gesture to the rest of the class?" or "What happens before George begins to hit other children?")

5. **Sequential conditions analysis**: When during the day does the behavior occur and/or is there a pattern of antecedent-consequent conditions across several occurrences of the problem behavior? When does the behavior not occur? (e.g., " "When does Mary …? Who is Mary with…? What is Mary supposed to be doing when…?")

6. **Identify consequent conditions**: What happens after the problem behavior has occurred? (e.g., "What happens after Mary…?" or "What do the other students do when Charles climbs on the radiator?" or "What do you do when George hits other children?")

7. **Summarize and validate antecedent, consequent, and sequential conditions** (e.g., "You've said that you and Timmy argue after you have asked him to do something, and he has refused. The argument continues as long as you try to talk to him. Is that correct?")

8. **Behavior strength**
    a. *Frequency*: How often a behavior occurs (e.g., "How often does Kevin have tantrums?").
    b. *Duration*: Length of time that a behavior occurs (e.g., "How long do Craig's tantrums last?").

9. **Summarize and validate behavior and behavior strength**:
    a. "You have said that Jason makes you angry and upset by disrupting class."
    b. "That he disrupts class approximately four times a week."
    c. "Is that right?"

10. **Tentative definition of goal-question consultee** (e.g., "How often would Patrick have to turn in his work to get along okay?" or "How frequently could Charles leave his seat without causing problems?")

11. **Assets question**: Determine what the student is good at (e.g., "Is there something that Mary does well?", positive attitude, persistence, social skills, sports, etc.)

12. **Questions about approach to teaching or existing procedures** (e.g., "How long are Charles and the other students doing seat work problems?" or "What kind of…?").

13. **Summarization statement and validation** (e.g., "Let's see, the main problem is that Charles gets out of his seat and runs around the room during independent work assignments. He does this about four times each day. Is that right?")

14. **Directional statement to provide rationale for data recording** (e.g., "We need some record of Sarah's completion of homework assignments, how often assignments are completed, what assignments are completed, and so on. This record will help us

to determine how frequently the behavior is occurring, and it may give us some clues to the nature of the problem. Also, the record will help us decide whether any plan we initiate has been effective.")

Adapted from Behavioral Consultation in Applied Settings, An Individual Guide (Kratochwill 1990).

Appendix E: Questions About Behavioral Function

QABF

Questions About Behavioral Function

Timothy R.. Vollmer & Johnny L. Matson

*Student:*_____ *Staff:*_____

*Target Behavior:*_____ *Date:*_____

One behavior per form

Rate each question on the following scale. Scoring on second page.

X	0	1	2	3
Does not apply	Never	Rarely	Sometimes	Often

___ 1. Engages in the behavior to get attention.

___ 2. Engages in the behavior to escape work or learning situations.

___ 3. Engages in the behavior as a form of "self-stimulation".

___ 4. Engages in the behavior because he/she is in pain.

___ 5. Engages in the behavior to get access to items such as preferred toys, food or beverages.

___ 6. Engages in the behavior because he/she likes to be reprimanded.

___ 7. Engages in the behavior when asked to do something (brush teeth, work, etc.)

___ 8. Engages in the behavior even if he/she thinks no one is in the room.

___ 9. Engages in the behavior more frequently when he/she is ill.

___ 10. Engages in the behavior when you take something away from him/her.

___ 11. Engages in the behavior to draw attention to him/herself.

___ 12. Engages in the behavior when he/she does not want to do something.

___ 13. Engages in the behavior because there is nothing else to do.

___ 14. Engages in the behavior when there is something bothering her/him physically.

___ 15. Engages in the behavior when you have something he/she wants.

___ 16. Engages in the behavior to try to get a reaction from you.

___ 17. Engages in the behavior to try to get people to leave him/her alone.

___ 18. Engages in the behavior in a highly repetitive manner, ignoring this/her surroundings.

___ 19. Engages in the behavior because she/he is physically uncomfortable.

___ 20. Engages in the behavior when a peer has something he/she wants.

___ 21. Does he/she seem to be saying "come see me" or "look at me" when engaging in the behavior?

___ 22. Does he/she seem to be saying "leave me alone" or "stop asking me to do this" when engaging in the behavior?

___ 23. Does he/she seem to enjoy the behavior, even if no one is around?

___ 24. Does the behavior seem to indicate to you that he/she is not feeling well?

___ 25. Does he/she seem to be saying "give me that (toy, item, food)" when engaging in the behavior?

QABF Scoring

Attention
1. Engages in the behavior to get attention.
6. Engages in the behavior because he/she likes to be reprimanded.
11. Engages in the behavior to draw attention to him/herself.
16. Engages in the behavior to try to get a reaction from you.
21. Does he/she seem to be saying "come see me" or "look at me" when engaging in the behavior?

Escape
2. Engages in the behavior to escape work or learning situations.
7. Engages in the behavior when asked to do something (brush teeth, work, etc.)
12. Engages in the behavior when he/she does not want to do something.
17. Engages in the behavior to try to get people to leave him/her alone.
22. Does he/she seem to be saying "leave me alone" or "stop asking me to do this" when engaging in the behavior?

Non-social
3. Engages in the behavior as a form of "self-stimulation".
8. Engages in the behavior even if he/she thinks no one is in the room.
13. Engages in the behavior because there is nothing else to do.
18. Engages in the behavior in a highly repetitive manner, ignoring this/her surroundings.
23. Does he/she seem to enjoy the behavior, even if no one is around?

Physical
4. Engages in the behavior because he/she is in pain.
9. Engages in the behavior more frequently when he/she is ill.
14. Engages in the behavior when there is something bothering her/him physically.
19. Engages in the behavior because she/he is physically uncomfortable.
24. Does the behavior seem to indicate to you that he/she is not feeling well?

Tangible
5. Engages in the behavior to get access to items such as preferred toys, food or beverages.
10. Engages in the behavior when you take something away from him/her.
15. Engages in the behavior when you have something he/she wants.
20. Engages in the behavior when a peer has something he/she wants.
25. Does he/she seem to be saying "give me that (toy, item, food)" when engaging in the behavior?

15	15	15	15	15
14	14	14	14	14
13	13	13	13	13
12	12	12	12	12
11	11	11	11	11
10	10	10	10	10
9	9	9	9	9
8	8	8	8	8
7	7	7	7	7
6	6	6	6	6
5	5	5	5	5
4	4	4	4	4
3	3	3	3	3
2	2	2	2	2
1	1	1	1	1
0	0	0	0	0
Attention	**Escape**	**Non-social**	**Physical**	**Tangible**
1. attention	2. escape	3. self stim	4. in pain	5. access to items
6. reprimand	7. do something	8. thinks alone	9. when ill	10. take away
11. draws	12. not do	13. nothing to do	14. physical prob	15. you have
16. reaction	17. alone	18. repetitive	19. uncomfortable	20. peers has
21. "come see"	22. "leave alone"	23. enjoy by self	24.not feel well	25. "give me that"

Appendix F: Student Assisted Functional Assessment Interview Form

Student-Assisted Functional Assessment Interview[1]

Student: _____ Date: _____

Interviewer: _____

Section 1			
1. In general, is your work too hard for you?	Always	Sometimes	Never
2. In general, is your work too easy for you?	Always	Sometimes	Never
3. When you ask for help appropriately, do you get it?	Always	Sometimes	Never
4. Do you think work periods for each subject are too long?	Always	Sometimes	Never
5. Do you think work periods for each subject are too short?	Always	Sometimes	Never
6. When you do seatwork, do you do better when someone works with you?	Always	Sometimes	Never
7. Do you think people notice when you do a good job?	Always	Sometimes	Never
8. Do you think you get the points or rewards you deserve when you do good work?	Always	Sometimes	Never
9. Do you think you would do better in school if you received more rewards?	Always	Sometimes	Never
10. In general, do you find your work interesting?	Always	Sometimes	Never
11. Are there things in the classroom that distract you?	Always	Sometimes	Never
12. Is your work challenging enough for you?	Always	Sometimes	Never

[1] Developed by Kern, L., Dunlap, G., Clarke, S., & Childs, K. (1994)

Section 2

1. When do you think you have the fewest problems with _____ (target behavior) in school?

   Why do you have problems during this/these times?

2. When do you think you have the most problems with _____ (target behavior) in school?

   Why do you have problems during this/these times?

3. What changes could be made so you would have fewer problems with _____ (target behavior)?

4. What kind of rewards would you like to earn for good behavior or good school work?

5. What are your favorite activities at school?

6. What are your hobbies or interests?

7. If you had the chance, what activities would you like to do that you don't have the opportunity to do now?

Section 3					
Rate how much you like the following subjects:					
	not at all		fair		very much
Reading	1	2	3	4	5
Math	1	2	3	4	5
Spelling	1	2	3	4	5
Handwriting	1	2	3	4	5
Science	1	2	3	4	5
Social Studies	1	2	3	4	5
English	1	2	3	4	5
Music	1	2	3	4	5
P. E.	1	2	3	4	5
Computers	1	2	3	4	5
Art	1	2	3	4	5

Section 4

1. What do you like about Reading?

2. What don't you like about Reading?

3. What do you like about Math?

4. What don't you like about Math?

5. What do you like about Spelling?

6. What don't you like about Spelling?

7. What do you like about Handwriting?

8. What don't you like about Handwriting?

9. What do you like about Science??

10. What don't you like about Science?

11. What do you like about Social Studies?

12. What don't you like about Social Studies?

13. What do you like about English?

14. What don't you like about English?

15. What do you like about Music?

16. What don't you like about Music?

17. What do you like about P. E.?

18. What don't you like about P. E.?

19. What do you like about Computers?

20. What don't you like about Computers?

21. What do you like about Art?

22. What don't you like about Art?

Appendix G: Fidelity Checklists

Fidelity Checklist
Adult Attention Intervention

____ 1. The teacher informs the student that they will be checking in with them throughout the class to see how well they are doing.

____ 2. The teacher checks in with the student when engaged in appropriate behavior and provides positive verbal feedback at least once per every five minutes during the instructional period if applicable.

☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

____3. The teacher uses specific rather than vague language to provide feedback (e.g. thank you for working on your math assignment).

____ 4. The teacher ignores instances of inappropriate behavior when possible.

____ 5. At the end of the class time, the teacher meets with the student to discuss the student's behavior.

____ 6. If the student engaged in inappropriate behavior throughout the class, the teacher discusses ways they student can improve their behavior during the next session.

____ 7. If the student does not engage in inappropriate behavior throughout the class, the teacher verbally praises the student for engaging in appropriate behavior.

Fidelity Checklist
Peer Attention Intervention

____ 1. The teacher informs the student that they will have the opportunity to sit with a peer of their choice at the end of the class period if they can display appropriate behavior through the class time and earn the required amount of tally marks.

____ 2. The teacher instructs the class as a whole to ignore instances of inappropriate behavior throughout the class and to focus on their own behavior.

____ 3. The teacher provides the student with tally marks for appropriate behavior at least once per every five minutes during the instructional time if applicable, but provides no attention during this time.

____ 4. The teacher ignores instances of inappropriate behavior when possible.

____ 5. If the student has earned time with a peer, it is provided.

____ 6. If the student has not earned time with a peer, the teacher provides feedback as to how the student can improve their behavior during the next class.

Fidelity Checklist
Escape Intervention

____ 1. The teacher informs the student that they will have the opportunity to skip some of the required classwork if they can display appropriate behavior through the class time and earn the required amount of tally marks.

____ 2. The teacher provides the student with tally marks for appropriate behavior at least once per every five minutes during the instructional time if applicable, but provides no attention during this time.

____ 3. The teacher ignores instances of inappropriate behavior when possible.

____ 4. At the end of the required time, the teacher meets with the student to discuss the student's behavior.

____ 5. If the student has earned a break from task demands, it is provided.

____ 6. If the student has not earned a break from task demands, the teacher discusses ways they student can improve their behavior during the next class.